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Engineering News-Record

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October 2, 1930

Highways of the World

MEN of all countries of the world will assemble in Washington next week for the International Road Congress. Hearty welcome awaits them. America owes them a warm greeting. They will bring to it fully as much new knowledge and new outlook as they themselves will gain. It is a rare opportunity to profit the entire civilized world.

EFFICIENT highway transportation has become the keystone of growth in every country. Through the rapid advance of new conditions and needs, roadbuilding the world over finds itself confronted by the same broad problems.

IT IS a further fact that the field of modern traffic is still unexplored in many of its critical phases. Even in the United States, foremost in the scope of its road modernization, advance of knowledge is barely keeping up with increasing requirements.

HOW can more durable roads be built at less cost? Does the answer lie in new surfaces, improvement in old surfaces, or radical change of subgrade practice? And what of the economics of highway planning and control? How much may safely be invested in better roads; how much must be invested to satisfy the wants of national development? These are vital questions for us. They are no less vital to every land, and upon them the international spotlight may be turned to good advantage.

THE Washington congress provides the opportunity. It is for the actual conduct of the sessions to develop the opportunity into tangible realization.

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Low Construction Costs
Uniform Speed Roads
Corpus Christi Dam Construction
Asphaltic Limestone Paving
Lightning and Pavements
Metal Base Pavement

New England Water Works Convention
American Welding Society Meeting

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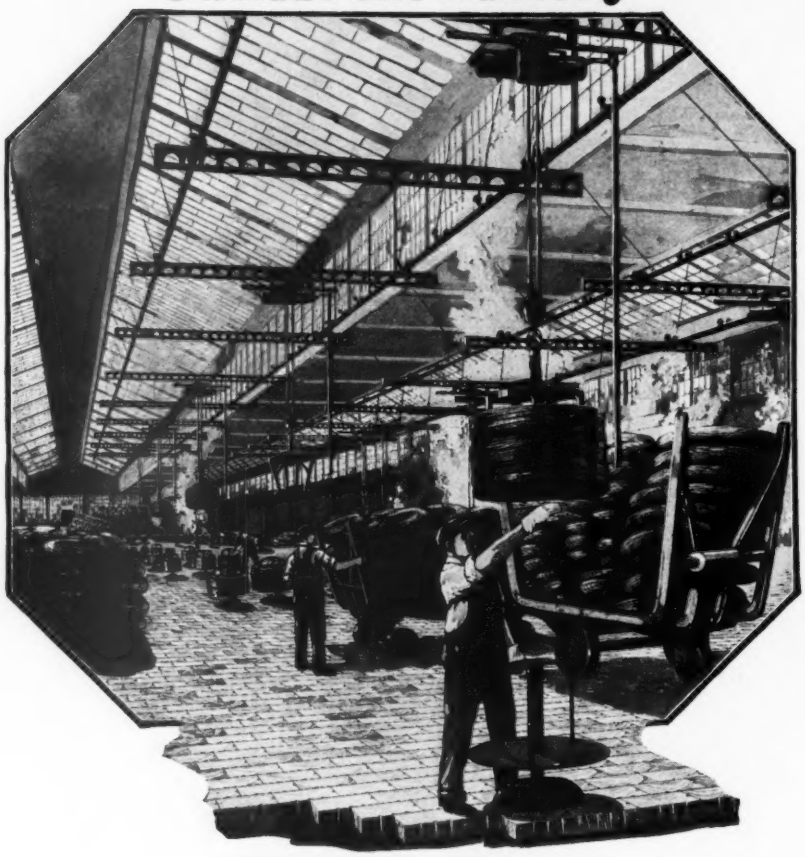

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DEVOTED TO CIVIL ENGINEERING AND CONTRACTING

F. E. SCHMITT, *Editor*

Volume 105 NEW YORK, OCTOBER 2, 1930 Number 14

For an International Road Art

TO THE men from the far corners of the earth who are assembling at Washington for joint study of road problems, the entire nation gladly offers hospitality. They meet with us in the effort to build up a new art, an art not yet beyond its earliest stages—an international road art. What the United States has done with its own problem, through the efforts of our road builders and students in every state and the strong guiding labors of the Bureau of Public Roads, is a highly significant contribution, but it is only one element in the larger subject of making roads available and useful to all the world. Widely variable soil and climate, resources, topography and customs dictate close adaptation of engineering method to local needs. Comparison of these needs and of the means adopted by different countries to meet them will lay a foundation for the broad international art, whose work will bind together the separated regions and peoples of the earth.

A Gigantic Undertaking

RATHER quietly a movement has started up whose immediate importance lies in its relation to the present low level of business activity, but whose roots lie much deeper. This is the movement initiated by President Hoover for a reform of house construction methods and financing. Every factor of house construction is distinctly archaic, as we have pointed out repeatedly. Design is a curious mixture of moss-covered tradition and new demands. Construction is still in the handicraft period, with almost no infusion of modern efficient-production methods. The product is unsatisfactory and short-lived; deterioration and repairs are a crushing burden. Financing is still conducted in the atmosphere of the usurious money lender of days long gone by, both as to supply of initial funds and as to permanent loans. The attempt to reform all these conditions—and all of them must be reformed if effective progress is to be made in any one of them—constitutes a gigantic task. Its detail organization still remains to be carried out, but even under the best organization it faces almost insuperable difficulties. Nevertheless there is ground for real hope in the very fact that the problem is being faced.

Governmental Neglect

WHILE undertaking reform of the private house-building field the national government might also devote some attention to reforming its own building practice. It has allowed unsafe, inadequate, improvised buildings to continue in service for a dozen years, as sole accommodation of important governmental bureaus and departments in Washington, without attempting either to replace them by new and proper structures or to render them reasonably safe by installing protective devices. A fire in the Federal Trade Commission building at Washington a month ago brought these conditions to notice most glaringly, but they have been known for years. During the war, many one- and two-story buildings of wood frame construction were erected in Washington to provide increased space for the enlarged governmental staffs. Work was in such a hurry and the buildings were intended to be so temporary in their occupancy that no automatic sprinklers were put in, and nothing beyond occasional hose lines furnishes protection against fire. Now, a dozen years later, something over a million and a half square feet of floor space of these unsafe temporary buildings remain, and still are in use, still without replacement and still lacking even sprinkler protection. Other temporary buildings, which are duly sprinklered or are more substantially built, are not included in this count. Government officials have preached to the country the duty of safe construction and safe maintenance of plant, but they themselves do not follow their own preachment. Perhaps a modest amount of good example would be worth a large amount of exhortation. Should there be another fire like that in the Federal Trade Commission and should it happen during working hours instead of at a time when the building is empty, the situation is likely to have further and rather sensational emphasis.

Profiting by Low Costs

NUMEROUS items of current news contribute proof that the facts on low building costs brought out in this column in recent weeks are recognized by many industrial leaders. The head of a large Eastern utility system last week instructed the managers of all the component utilities of the system to contract at present prices and costs so far as prospective needs justify. A large saw manufacturer has contracted for a new plant, to cost more than a million. An automobile supply company is beginning construction of a new plant, at an expenditure of several millions. A large-scale housing development of unusual character is going ahead in Cleveland. Here is tangible evidence that some men see clearly enough to take advantage of present low costs. On another page of this issue are presented data from widely distributed locations and fields of construction on the decrease in construction costs from the normal figures of recent years. The facts cited, together with the stability of wage rates which we discussed last week, indicate not only that costs are remarkably low but that a further lower rate is quite improbable. Whoever invests in new plant construction now is therefore doubly wise: He is investing at bottom prices and he is putting himself in position to produce for coming demands on a modernized, efficient basis. For, during the lull of business, the requirements of the market have sharpened up; the buyer is more exigent, and expects higher quality, better product as well as lower price. For some time to come he is

likely to be more selective, looking for the best-designed product at a low figure. The producer who has modernized most effectively and taken advantage of the low cost levels of today will be in most strategic position.

Model Traffic Ordinance

IN HORSE-AND-BUGGY days the single basic traffic rule of "Keep to the right" was all that was really essential for the holder of the lines to remember in his relation to vehicle traffic. The advent of the automobile has brought forth bulky codes and a multitude of highly conflicting special rules, the natural outcome of uncoordinated city and state legislation. Automobile traffic, however, long since ceased to be a local matter. The drafting of a model traffic ordinance three years ago by the National Conference on Street and Highway Safety, and its revamping by two subsequent conferences, is a necessary step forward, looking toward utility as well as safety. Eight hundred municipalities have already adopted the ordinance, and three states, New Jersey, New York and Wisconsin, have written its provisions into their statutes. Universal adoption of the model ordinance is a necessary reform.

Maintaining Society Membership

PREDOMINATING in interest at last week's meeting of the New England Water Works Association was the question of obtaining greater participation by the younger members of the water-works fraternity, particularly among the operating staffs. First brought up in the superintendents' session, where it provoked more intensive discussion than any other subject presented, the idea also formed the central theme of Robert Spurr Weston's address as retiring president. The subject of obtaining new members is one which, in some form, concerns not only this particular society but also every other technical association. Unless such a body can draw to itself additional members from those men who, in the natural course of events, will succeed the present leaders in engineering and administration, it is self-evident that the society will dwindle both in membership and in accomplishment. Such arguments are elementary; discussion at Atlantic City indicated that the general membership is fully aware of their significance. What it does not realize, apparently, is that, in the absence of a permanent full-time staff the onus falls directly upon the individual members.

Reaping the Harvest

RAILROAD companies in increasing numbers are beginning to reap the harvest of their sowing in the preservative treatment of ties. A few years ago the expected economies from the use of treated ties were largely theory; expensive theory at that, since the money which went into the construction of tie-treating plants or into the purchase of treated ties was outlay which lacked immediate return. Now the harvest is ripening. Treated ties in the tracks have reached the age when they would have had to be renewed had they been untreated, and still they have years of serviceable life ahead. The investment required to replace them is indefinitely postponed; the labor cost of changing them is entirely saved. Furthermore, some railroads are rapidly approaching the transition period during which their tie requirements will amount to almost nothing, a period which will last until the first of the treated ties needs to be renewed. Thereafter their annual requirements will return to a uniform figure, the amount of which, however, will be but a fraction of their former annual requirements because of the increase in the life of ties obtained by preservative treatment.

Greetings to a Collaborator

A NEWCOMER has joined the ranks of engineering journals. *Civil Engineering*, new monthly of the American Society of Civil Engineers, made its first appearance this week. Clear, clean and precise—expressing the spirit of the great art which it represents—the new journal comes before the profession in a manner to engage esteem and awaken hopeful expectations. We extend to it warm welcome as a collaborator. The task of publishing the news of thought and action in the civil engineering world is great and worthy. It is not without its difficulties and responsibilities, but we hope that the new journal will succeed in bearing the burden lightly. Though its mission differ from ours, since it labors within the domain of society activity, *Civil Engineering* can do much to aid the forces that endeavor to further and upbuild our profession. In this service *Engineering News-Record* is glad to join hands with its new fellow-worker.

Is Science Serving Engineering?

SOME weeks ago an engineer found it necessary to reproach the students of earthquake science for their failure to supply data on the forces which must be resisted by engineering structures in earthquake regions. John R. Freeman addressed the Seismological Society on the uselessness of seismological observations to engineers, and asserted that only one or two actual measurements of destructive earthquake forces can be found in the whole record of earthquake observation—and these not very conclusive. He charged that earthquake scientists seem to give sole attention to observing the faint movements of distant earthquakes, useful chiefly to support speculations on the inner structure of the earth. The instruments used in these observations are valueless for engineering purposes, since they are incapable of measuring violent earthquakes but go out of commission when a strong earthquake occurs near by. Mr. Freeman's indictment raises the question whether science is serving engineers adequately.

There is a similar situation in the field of wind observation. The anemometer measurements carried on by weather observers tell us little or nothing about wind forces, although a vast amount of human construction depends on a knowledge of these forces. Anemometers indicate the average velocity of the wind, and even this they measure to a false, artificial scale, so that the published figures mislead more than they inform. Wind pressures are never measured. The variability of the wind is not observed, but the measuring is done just as though the wind blew a smooth, steady blast, which it manifestly does not. Thus the variations or gusts of the wind, upon which its structural attack largely depends, remain unknown. As if all this were not enough to condemn wind observations, there is the further deplorable fact that when a hurricane or tornado comes along the anemometers go out of action or are blown away. As a net result of these conditions the engineer of today has no better knowledge of wind forces than his predecessor of fifty years ago.

If science thus fails the engineer, what is the outlook for the future? Can we look forward to the production of proper scientific data at an early date? Or will it be necessary for engineers to develop their own fundamental scientific data? Apparently the latter is the case. No trend is observable in scientific circles that makes likely any improvement in the supply of information for the use of engineers. The individual scientist is far removed from engineering interests and has but little appreciation of what the engineer needs. Centralized scientific research bodies, though some of them have deliberately assumed the task of serving engineering—as in the case of the National Research Council's engineering division—have brought no improvement in the condition described.

It is probable, then, that engineers must depend upon their own efforts to obtain the fundamental data which they need in the development of their proper work. This may mean special organization of a kind not yet established, but by no means impossible or seriously difficult. Some of the research work of recent years within the field of engineering has been of such high type—witness the track-stress investigation—as to rank with the best scientific research. The ability exists within the profession; but as for adequate organization to apply this ability, with rare exceptions engineering has not yet arranged its investigational planning broadly enough to live up to the large responsibility suggested. Early progress in dealing with such problems, for example, as that involved in the stability and security of buildings reaching a thousand or two feet into the air calls for more energetic study of basic data than has yet been attempted.

Dead Wood in Technical Societies

AT THIS TIME, when the activities of technical societies are being revived after the summer season, it is pertinent to ask how many members of such societies are just so much dead wood in their organizations. How many limit their professional society activity to listing their memberships in several societies on their letterhead with a view to impressing their clients, or simply to paying their dues, thinking that their obligations to their fellows are fulfilled thereby? How many take any active part in the work of local sections or chapters?

Just now the New York section of the American Society of Civil Engineers is carrying on an active campaign to make its membership truly representative of the 2,500 members residing in the New York metropolitan district. At present only about one-fifth of these men are members of the local section and an even smaller number take any part in its activities. The New York section case is not typical of other sections of that society in the matter of the small percentage of the total resident membership on its rolls, but it is safe to say that it is typical of the lack of active participation by resident members in local society affairs.

Membership in a technical society carries with it a greater obligation than that of sending in a check for dues each year. If it means anything at all, it requires that each member contribute to the extent of his time and ability to the technical work and professional activities of his organization. If one member, for example, presents a paper to the society for publication in which is set forth a theory which other members believe to be unsound, those members have not fulfilled their obligation to the society until they have recorded their reasons for their disapproval of it. Only thus will the society's permanent records become a true record of present-day thinking along engineering lines. Silence here, as always, gives consent; and if the silence is complete, the society in effect places approval upon the theory propounded in the paper which it has published.

Similarly in professional and civic matters—usually the principal subjects of definite action on the part of local sections—action by the local organization is not truly representative of the views of the society's membership in that region unless practically all the members of the local section take sufficient interest in what the section is doing to act intelligently upon current matters.

Of course there are many working difficulties in the way of living up to such an ideal as this. Preoccupation with the task of earning one's daily bread is chief among them; another is the unnoticed expenditure of time upon such diversions as radio and automobiles. Too few of us have anything like the amount of leisure for reading and study that we know we should have. Technical society matters are neglected for that reason. Yet between the ideal attitude toward such matters and that assumed by most engineers there is too wide a gap. It can be reduced in many cases by a better regulation of one's time.

If it cannot be reduced, then it is time to give thought to dropping out of some or all of the societies of which the individual may be a member. Better be live wood in one society than a piece of dead wood in many. Such a change would be helpful to the individual; when carried out generally such action would be helpful in determining whether or not we have too many technical and professional societies. Many engineers believe that we have. Wholesale resignations from any one society would soon show that that organization had ceased to be a vital thing.

St. Lawrence Power Plans

NEW YORK STATE has undertaken to find a way of developing its share of the power in the international section of the St. Lawrence River through the agency of a state-controlled utility corporation. At its last session the legislature, which theretofore had stood steadfast against attempts to upset the state's established policy of private development under lease from the state, gave in to the Governor's insistent demand that a study be made of means of developing the St. Lawrence River under trustees for the state. Accordingly it passed legislation authorizing the Governor to name a commission to make such a study.

Early in the year the Governor appointed the commission, and now the commission has named a board of engineers to handle the technical details of its work. An able board has been named. All are outstanding men, with a background of engineering experience that will make them especially useful to the commission. Moreover, the commission's hands are not tied by any restrictions as to how or by whom the power is to be developed. First consideration must be given to development by a state agency, but should that be found impracticable, then it is free to say what other means if any are practicable. With this freedom given to its commissioners, and with such an able board of engineers at its command, New York State has entered upon the most constructive step yet taken toward obtaining power from the idle rapids of the St. Lawrence River.

FIG. 1—CONSTRUCTION OF OVERFLOW SECTION, CORPUS CHRISTI DAM
Note bank at left, which creates cushion pool for overflow. Counterfort north abutment at right.

Building New Dam for Corpus Christi Water Supply

Combination Earth and Concrete Structure in Texas Rests on Sand and Gravel Valley Floor—Wood-Pile Foundations Carry 400,000-Sec.-Ft. Concrete Spillway—Reservoir Assures City of Ample Water Supply

ALONG concrete overflow of unusual design, resting on wood-pile foundations and with a spillway capacity of 400,000 sec.ft., is an interesting feature of an earth dam completed early this year for water storage for the city of Corpus Christi, Tex. At the site of the dam, on the Nueces River 35 miles northwest of the city, the entire valley floor consists of a 10-ft. thickness of silt over a 30-ft. stratum of sand and gravel, which rests on a hard pink clay of unknown depth. The location of the dam was determined by topographical conditions, being the lowest point on the river where the hills at the edge of the coastal plain come together close enough to provide a dam and reservoir site.

Corpus Christi has long used the Nueces River as a source of water supply. A diversion dam was built years ago at Calallen (see map, Fig. 2), 18 miles upstream, to divert water into a filtration plant, from which the supply is pumped through a pipe line to the city. This diversion dam also keeps salt water from backing up into the source of supply. The average annual flow of the Nueces is 575,000 acre-ft., or approximately 750 sec.-ft., but varies from practically nothing for months at a time to a maximum recorded flood flow of 125,000 sec.-ft.

Because of this unsteady flow the new dam at La Fruta was built to create a storage reservoir of 64,000-acre-ft. capacity. Water released through the dam flows down the river to the diversion dam. Water is also sold to several neighboring towns. The cost of the project, totaling $2,500,000, including land, will be paid for by bonds to be retired from water revenues only, with no direct property tax or lien on property other than the water-works plant.

General Design—The dam consists of a 500,000-cu.yd. earthfill with a concrete-overflow ogee section, the total crest length being 4,080 ft., including the spillway length of 1,250 ft. The maximum height of embankment is 61 ft. The spillway elevation is 22 ft. below the top of embankment abutments. Flashboards can be added to the top of the spillway in the future to offset the effect of silting in the reservoir. As in all Texas dams, silting is a serious consideration at Corpus Christi, as it is estimated that 2,000 acre-ft. of silt will be deposited annually. Clearing was a heavy item on the project, requiring the removal of trees and brush from practically all of the 6,000-acre reservoir area.

Material was borrowed from the reservoir basin and

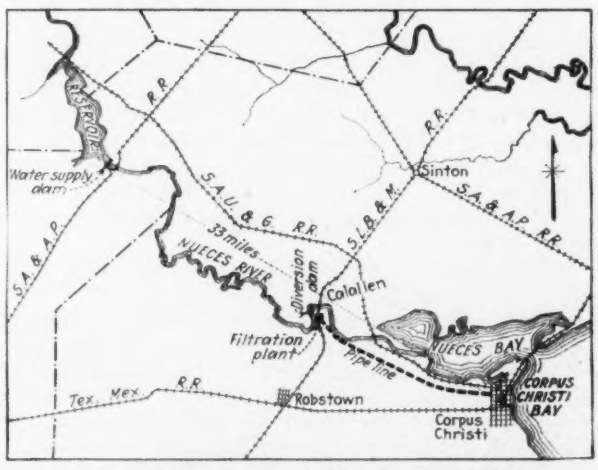


FIG. 2—CORPUS CHRISTI AND VICINITY, SHOWING NEW DAM LOCATION

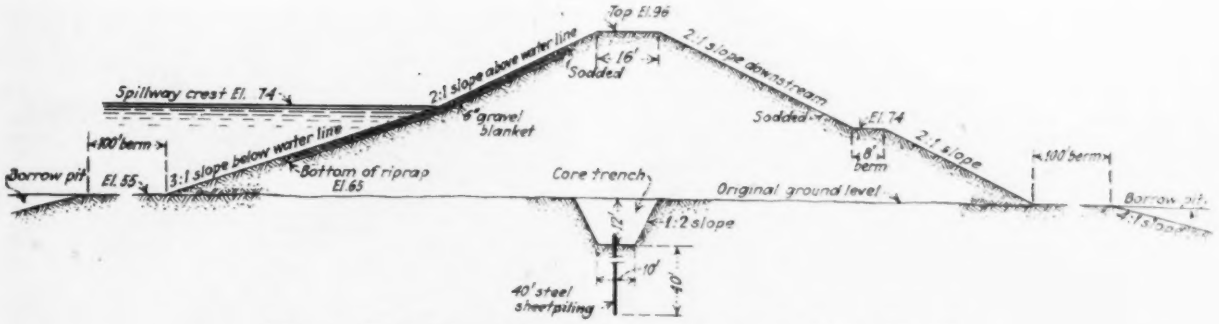


FIG. 3—AVERAGE CROSS-SECTION OF RIPRAPPED EMBANKMENT

from the valley floor downstream from the dam, in both cases leaving a 100-ft. berm between the toe of the fill and the borrowpits. The downstream slope of the fill is 2:1 with an 8-ft. berm about halfway up the slope. The upstream side is of 2:1 slope above spillway crest level and 3:1 below this level. For 16 ft. above and 29 ft. below spillway level the upstream slope is protected by heavy riprap on a 6-in. gravel blanket, the riprap being laid rough to break up wave action.

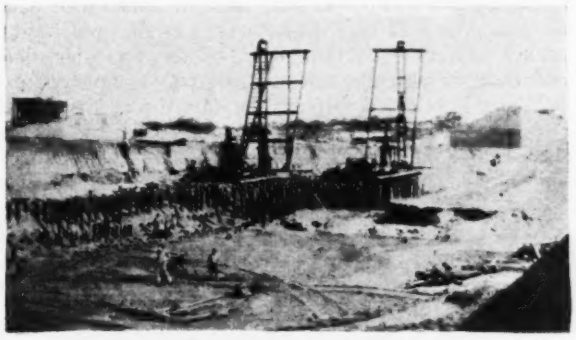


FIG. 4—DRIVING FOUNDATION PILES FOR SPILLWAY SECTION
Note design of skid drivers with leads traveling transversely on top beam of H-frame.

A core trench about 12 ft. deep and 10 ft. wide at the bottom was excavated along the center line of the dam. Steel sheetpiling averaging 40 ft. long was driven from the bottom of the trench into the hard clay to provide a cutoff beneath the dam.

Spillway Section—The concrete overflow section, 1,250 ft. long, is the most interesting part of the project. Although the maximum floodflow ever recorded is 125,000 sec.-ft., the spillway is designed to take care of a flow of 400,000 sec.-ft. In such a flood the depth of water over the spillway crest would be 22 ft. A cross-section of the spillway is shown in Fig. 6. The downstream toe elevation of the spillway was determined by overflow conditions, but, as the structure was founded on piles, the bottom of the main section was raised to save concrete, as can be seen in Fig. 6. The spillway is an ogee section with a reinforced-concrete apron from 1 to 3 ft. thick extending the full width of the overflow for a distance of 85 ft. downstream from the bottom of the ogee section. Reinforcing in the apron consists of a top layer of ¾-in. round bars and a bottom mat of 1-in. square bars, all spaced 18 in. on centers both ways. The apron floor is at approximately riverbed elevation and is 20 ft. below the average valley floor elevation in front of the spillway, which creates a cushion pool to receive the overflow and to prevent scour beneath the apron. Two training walls extend for some distance downstream beyond the edge of the apron to confine the overflow and direct it far below the lower toe of the embankment.

TABLE I—QUANTITIES, CORPUS CHRISTI DAM

Embankment, cu.yd.	500,000
Concrete, cu.yd.	50,000
Riprap and gravel blanket, tons	16,000
Wood-piling, lin.ft.	150,000
Steel sheetpiling, tons	2,500
Reinforcing steel, tons	650
Clearing, acres	5,000
Reservoir area, acres	6,000
Reservoir capacity, acre-ft.	64,000
Drainage area, square miles	16,000
Total crest length, ft.	4,080
Maximum height fill, ft.	61

TABLE II—RELATION OF CUSHION POOL DEPTH TO DEPTH OF FLOW OVER SPILLWAY CREST

Crest depth, ft.	1	2	3	4	5	10	15	20
Pool depth, ft.	12	21	24	27	29	34	41	48

As the depth of water passing over the spillway crest increases, the depth of the cushion pool increases proportionally, as is shown in Table II.

For construction purposes and to provide a better foundation the spillway section was located off the riverbed toward one end of the dam (Fig. 5). The embankment is confined at both ends of the spillway by counterforted reinforced-concrete abutments. The spillway section and both abutments are carried on 25-ft. wooden piles spaced 2½ to 3 ft. on centers each way.

The two training walls extending downstream from the abutments consist of earth embankments behind reinforced-concrete walls, which are protected by sloping reinforced slabs 50 ft. wide at the foot of each wall. The training wall on the south (river) side is 215 ft. long; the other is 80 ft. long.

Drainage and Scour Protection—Fig. 6 shows the loca-

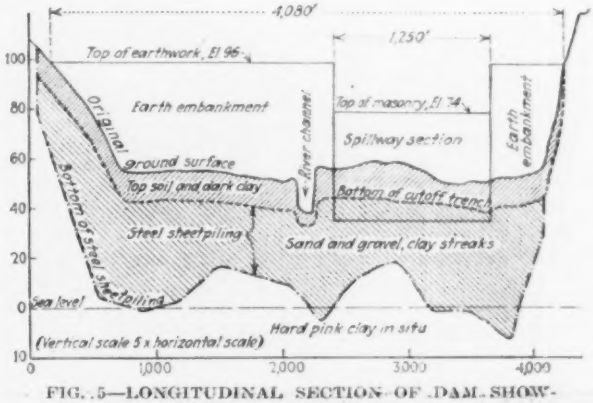


FIG. 5—LONGITUDINAL SECTION OF DAM, SHOWING LOCATION OF SPILLWAY SECTION AND CHARACTER OF FOUNDATION

tion of two longitudinal tile drains under the spillway section, installed to relieve the masonry of uplift. From the longitudinal drains transverse drain pipes lead downstream to the open. These transverse drains are placed every 100 ft. between abutments.

To prevent scour from backwash arch-web steel sheeting 30 ft. long was driven under the toe of the paving slabs on the training walls and for 100 ft. under both ends of the toe of the spillway apron. Under the remainder of the apron toe 16-ft. arch-web steel sheetpiling was driven.

Excavation and Fill—Loam and topsoil were stripped off the entire site of the dam. An elevating grader hauled by a tractor and wagons handled by teams were used in placing the embankment. Dirt was dumped so as to spread in 9-in. layers, wetted almost to the point of bogging down the wagons and rolled with a 10-ton steamroller with corrugated rolls, giving an earth pressure of 225 lb. per square inch.

Piledriving—Wood piling, totaling 150,000 lin.-ft., was driven for the foundations of the abutments and spillway. Driving was done by two H-frame skid drivers, shown in Fig. 4. The frames of the drivers were 20 ft. wide and the leads traveled transversely on a top beam to permit driving seven or eight piles without moving the rig.

Concrete—All concrete was poured from a 1-yd. paving mixer traveling along the upstream side of the spillway and along the bank above the lower end of the apron. Three methods were used in placing, depending upon the location of the pour. Where possible, the concrete was chuted directly from the mixer. In other places the concrete was handled by a traveling crane and dump buckets. For the high parts of the structures concrete was chuted from a traveling hoist tower that was moved with the mixer. Batches were proportioned at a central batching plant and hauled to the mixer by trucks.

River Diversion and Water Control—As the spillway section was built off the riverbed, the stream was not disturbed until the overflow section had been completed.

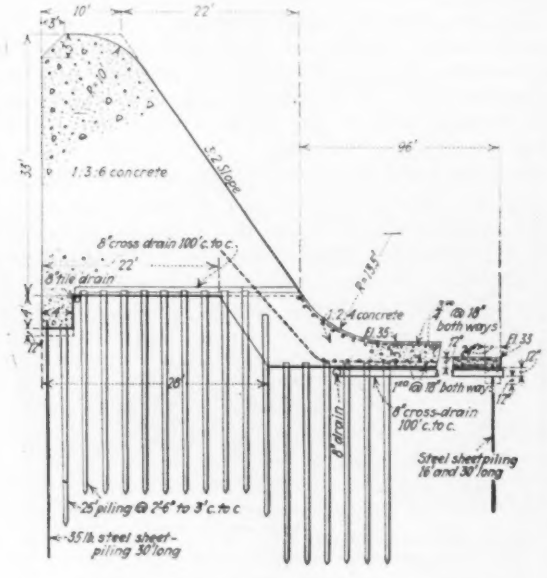


FIG. 6—CROSS-SECTION OF SPILLWAY
Note how bottom of main section was raised, effecting considerable saving in concrete.

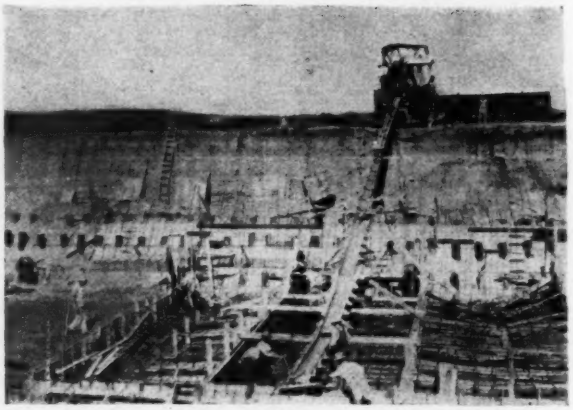


FIG. 7—POURING CONCRETE FOR SPILLWAY APRON
Bank shown in background is on upstream side of spillway. Height of bank indicates height of valley floor (reservoir bottom) above spillway foundation and apron.

The river was then diverted through an 8-ft. gap left in the spillway at apron level near the south end of the section. Two 50-ft. gaps were left in the spillway at a higher elevation to take care of any possible floods occurring before the embankment was completed.

Water is released through the dam through two 20-in. and one 48-in. controlled outlets located in the spillway section and one 48-in. controlled conduit placed in the embankment.

One flood, occurring as the dam was nearing completion, caused some damage by washing out around the south abutment and under the south end of the spillway apron. As stated above, the 8-ft. river-diversion gap was located near the south end of the spillway. A narrow channel had been cut through the bank in front of the spillway apron to the river channel some distance below the dam, this channel being located about in the center of the overflow section. In case of flood it was planned to close off the river-diversion gap with stoplogs and raise the reservoir level to discharge the flood through the 50-ft. gaps. This would have created a cushion pool over the spillway apron and probably would have prevented damage. However, when this flood came the contractor was prevented from closing the small gap by an injunction secured by several landowners within the reservoir area whose land would have been flooded and who had not received final settlement for their property.

As a consequence of this the flood poured through the narrow gap under a 35-ft. head and the stream was directed against the bank in front of the spillway apron. At the time, the south training wall was under construction and sheetpiling only 16 ft. long had been driven under the training wall toe and the apron toe. The high velocity jet turned aside by the bank soon washed out under the short sheeting and behind the abutment. Besides washing out considerable fill from behind the abutment, a small pocket, 10 ft. deep, was washed out under the apron, though the apron slab was not damaged. This pocket was later filled with concrete. As soon as a new channel outlet was excavated from directly in front of the gap to the river the scouring stopped. Steel sheeting, 30 ft. long, replaced the shorter sheeting along the training walls and part of the apron.

After the dam was completed the first few full overflow floods removed a considerable portion of the bank directly below the apron, but the depth of cushion pool

remains almost constant, as the valley floor below the dam is practically the same elevation for miles.

Although no villages existed in the reservoir area, there were several gas wells that had to be taken care of. Most of them were protected by building a concrete ring wall around the well, the top of the wall being above water level. In several others the pipe was raised to a platform resting on piling.

There is no leakage through the fill or through the masonry section. Percolation under the structure is uniform across the valley, amounting to an estimated amount of 250 g.p.m., which has now fallen off to about 200 g.p.m., indicating that the interlocks of the sheet-piling cutoff are silting up.

Contractors and Personnel—The project was built by the city of Corpus Christi on the initiative of P. G. Lovenskiold, mayor. Smith Brothers, of Dallas, were general contractors, with Gifford-Hill Construction Co., of Dallas, the sub-contractor on earthwork. Hawley & Freese, of Fort Worth, were consulting engineers, with John D. Waring, Jr., as resident engineer.

Metal-Base Pavement Sections Laid as Experiments

Corrugated Sheets and Flat Plates Used as Base for Brick Surface on Illinois Road

THREE 50-ft. experimental sections of brick pavements on special metal bases were laid the middle of September in a highway under construction in the outskirts of Springfield, Ill., on South Grand Ave., at the connection with Rochester Road. The three types of metal bases used were one section of 10-gage galvanized corrugated iron laid with corrugations transverse to center line of road; one section of similar material laid with corrugations longitudinal with the road; and one section of ¼-in. blue annealed flat iron plate. The paving bricks were bedded on a hard sand mastic cushion made up with cutback material and were filled with an asphaltic filler.

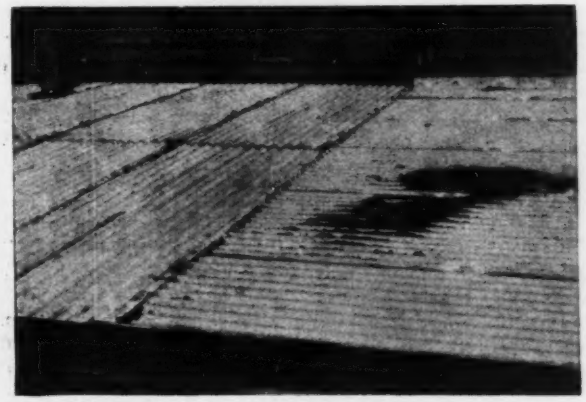
The road is being constructed by Sangamon County, but the Illinois state highway department made accurate observations of construction procedure and will keep full maintenance and performance records of the experimental sections. This new type of road, described fully Sept. 4, 1930, p. 381, attracted wide attention.

LAYING METAL BASE FOR BRICK PAVEMENT
In the transverse section the center edge was laid on a tee and the outer edge on an angle. Camera is standing on flat-plate section.

The subgrade was graded with a power grader running on side forms continuous with the concrete base slab at either end of the metal-base section. Subgrade material is a black clay loam which packs hard under a roller when moist and which normally shows ½- to 1-in. "map" cracks when drying in side ditches. It is typical central Illinois black land quite similar to the material under the famous experimental Bates Road. The roller left the subgrade so hard it was necessary to use a hatchet and spade in cutting grooves for the bent-down edges of the iron sheets locking the plates into the subgrade. To make further close contact with all parts of the corrugated sheets the surface of the subgrade was raked to a depth of 1 in. before the plates were firmly seated with heavy tampers and sledges. On lifting the plates after this procedure the imprinted subgrade surface appeared fully corrugated.

All of the sheets were Armco iron. Immediately previous to laying, the under side of the sheets were coated with protective paint. The corrugated plates were spot-welded together and to the supporting tees and angles on which they were laid. An acetylene outfit on the job facilitated the laying operations by cutting the stock sheets to fit the road dimensions.

The experimental sections were laid under the direction of W. H. Mosely, vice-president, Poston-Springfield Brick Co., and with the co-operation of the National Paving Brick Manufacturers Association and the American Rolling Mill Co.



TRANSVERSE AND LONGITUDINAL SECTIONS OF CORRUGATED SHEETS SPOT WELDED
The longitudinal sections are turned up at the edges to form a curb for the brick. An angle serves this purpose and provides seat where the sheets were laid transversely.

CHOPPING A GROOVE IN HARD SUBGRADE TO RECEIVE THE TURNED-DOWN EDGE OF SHEET
The under surface has been smeared with a protective coating, covered with cloth and another application of protective coating given.

Asphaltic-Limestone Paving Methods on Alabama Highway

Use of Special Machine for Spreading Limestone Mix With Close Control of Details Produced a Road of Unusual Smoothness

By F. A. Salmon
Resident Engineer, State Highway Department, Florence, Ala.

TWO-STAGE construction and asphaltic-limestone surfacing were employed with notably successful results in building 17.37 miles of highway from Florence, Ala., northeast to the Tennessee line in 1929. Construction was begun April 24 and the road was completed Dec. 13. In 100 working days 185,084 sq.yd. of pavement was laid at an average rate of 1,851 sq.yd., or 925 ft. of 18-ft. road. The maximum day's run was 2,527 sq.yd., or 1,263 ft. of road. With this progress excellent results were obtained in surface uniformity by the use of a mechanical spreader devised by the contractor.

Road Structure and Materials

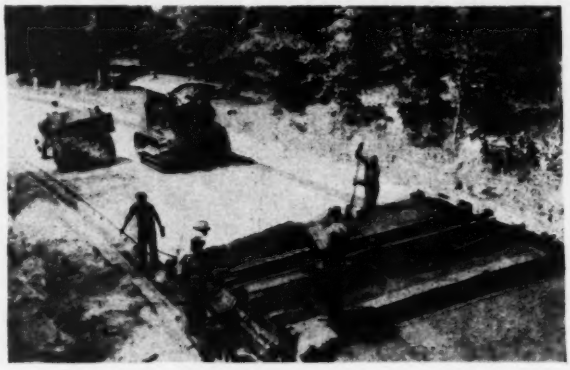
The road was graded and surfaced with 8 in. of pit-run chert in 1927. All embankments were placed in thin layers to reduce settlements, and approximately twelve months was allowed to elapse in order that settlement might be complete. The chert surface was necessary to accommodate traffic during this interim, and in addition it provided an excellent sub-base for the pavement. Care was taken to lay the chert as close to the theoretical grade and cross-section as was practicable and the surface was maintained so that when the pavement was placed, the laying of grades was simplified and subgrade work was a minimum.

The Alabama asphaltic limestone with which the road was surfaced is a fine-grained limestone, slightly harder than the asphaltic limestone of Europe and Texas. It has been used for six years with excellent results on Alabama state highway work. Experience has shown that, where proper base conditions are provided and where care is used in placing, it makes a road second only to concrete in riding quality. It was thought that this single disadvantage could be almost entirely overcome by the use of steel forms and a mechanical spreader, and this opinion was substantiated by the results. The subsoil was ideal, being almost entirely a strong, chert-bearing clay.

Asphaltic-limestone pavements have always been noted for their resistance to displacement under traffic. Alabama asphaltic limestone shows stability and sheer strength considerably higher than that developed in heavy traffic sheet-asphalt and asphaltic-concrete mixtures. This explains the resistance of these pavements to displacement under traffic. In addition to assurance against shoving or waving, the high stability developed allows the use of a somewhat softer asphaltic cement and a higher percentage of asphalt in the mixture than would ordinarily be safe. This tends to increase the durability of the pavements, as it prevents weathering and cracking and the low voids in the compressed mixture prevent water absorption.

FORM LAYOUT FOR WIDENED CURVES

The pavement was designed and laid as a two-course slab of uniform thickness except for an inverted curb of base mixture, 4 in. deep and 6 in. wide, on each edge.



ASPHALT-SPREADING MACHINE PULLED BY TRACTOR

Materials and Plant

Except for the spreading machine described later, all the plant was standard equipment. The asphalt plant was the standard hot-mix installation and was set up with regard to convenience and economy of arrangement. The plant had a rated capacity of approximately 330 tons per day of thirteen hours. It averaged 445 tons per day for the job with a maximum run of 609.5 tons on Oct. 14.

Slag was used as coarse aggregate in the base mixture and was secured at an old slag dump within 200 yd. of the plant. The slag, after being loosened by shooting, was loaded by steam shovel onto a 24-in. belt conveyor. This conveyor carried the material up to a revolving cylindrical screen having one short section of ½-in. screen and a long section of 1½-in. screen. The small screen removed approximately 80 per cent of the fines, dropping them into a bin below. The rest of the material up to 1½ in. was dropped into a separate bin, from which it was loaded by chute directly into trucks and hauled to

PLACING INVERTED CURBS OF BASE MIXTURE

the stockpile. All material above 1½ in. was wasted. The fines were used to proportion the mixture.

The asphaltic limestone was shipped in crushed. It contained from 3½ to 5½ per cent of native bitumen having a penetration of from 15 to 20. On account of the deficiency of material between the 40- and 80-mesh screens in the limestone, an admixture of fine sand, varying from 22 to 25 per cent, was used. This sand admixture was also of great value as an abrasive. Approximately 5 per cent of asphalt having a penetration of from 85 to 100 per cent was added to the sand and asphaltic limestone. Asphalt of from 40 to 50 penetration was used in the base mixture. Typical analyses of both base and surface-course mixtures are given in the accompanying table. The average composition of each 1,000-lb. batch was as follows:

Base Mixture		Surface-Course Mixture	
Asphaltic cement	50 lb.	Asphaltic cement	50 lb.
Coarse aggregate	550 lb.	Asphaltic limestone	720 lb.
Fine aggregate	400 lb.	Fine sand	230 lb.

Mixtures were delivered to the spreader at the following temperatures: base, from 225 to 325 deg. F.; surface, from 280 to 350 deg. F.

Construction Methods

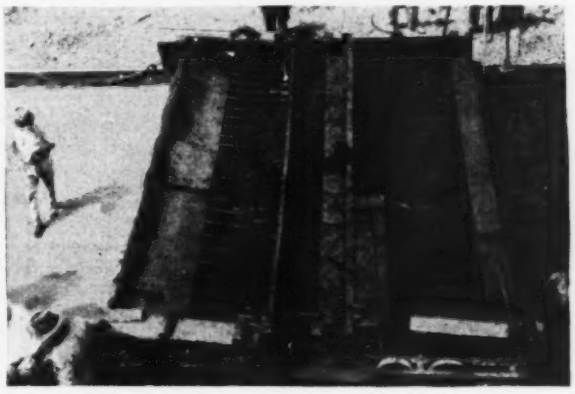
After the job got well under way, no delays were experienced except from weather conditions. The road was paved during the most desirable season of the year, but this section experienced one of the wettest years and one of the hardest winters in its history during 1929. Each rain resulted in a delay of from one to three days, as care was taken to suspend all operations until the form foundations were dry.

During the latter part of the job (December) extreme air temperatures were encountered, some sections of both base and surface being placed at temperatures as low as 9 deg. above zero. This, of course, resulted in a pronounced inferiority of surface finish due to rapid cooling, but even these sections were above the average for finish and riding quality of asphalt pavements.

Form-Setting—Form trenches were roughed out by a road machine, pulled by a tractor, after which the trenches were brought to approximate grade with pick and shovel. Forms were then set and brought to true line and grade by backfilling and tamping. On account of the extreme weight of the spreader, which was around 5 or 6 tons, great care had to be used in the form-setting to give each form a uniform bearing throughout its entire length on thoroughly compacted earth. The forms used were standard 9-in. steel forms. They were maintained true to line and grade, usually 1,200 and never less than 800 ft. in advance of the paving.

Subgrading—The old chert surface was scarified to a uniform depth of 2½ to 3 in. and reshaped, first with a one-man grader and then with a subgrader. The blades of the subgrader were set to the true crown but approximately ¼ in. high to allow for compaction. The subgrade was then sprinkled and compacted with a 10-ton roller. The writer feels that he can truthfully say that the subgrade was a wonderful piece of work. It was thoroughly checked with templet and straight-edge, and a variation of ¼ in. from the true section was an extreme rarity. Finished subgrade was maintained from 600 to 1,200 ft. ahead of the paving.

Paving—The paving mixtures, both base and surface, were spread by a Newell mechanical spreader, pulled by a 60-hp. tractor. The spreader is an invention of A. T. Newell, president of the Newell Contracting Co., and is made up of a series of stationary rakes and screeds. The last screed gives a trowel effect, showing the irregularities for the benefit of the backrakers. The spreader has a capacity of approximately six tons. Trucks were backed up to the spreader and the mixture dumped onto a grating, which broke up any compaction which may have taken place during transportation. The schedule for the day's work ordinarily consisted of topping out the previous day's base, usually completed about 10 a.m., and laying base for the rest of the day. The average day was about thirteen hours from 5 a.m. to 6 p.m.



CLOSE VIEW OF ASPHALT-SPREADING MACHINE

Both courses were sealed by one 10-ton and one 8-ton roller, the cross-rolling on the surface course being handled by the two 8-ton tandems. The inverted curb was trenched by hand, filled with base mixture and compacted by hot hand tamps from 50 to 400 ft. in advance of the paving.

The surface course was laid with finished surface at the edge ¼ in. above the forms, in order to prevent bridging of the roller from form to crown and to secure uniform compaction from form to form. One of the backrakers was charged with checking and correcting any irregularities which might show up during the sealing. This checking was done with an ordinary 10-ft. straight-edge and standard templet. The backraking and patching were handled so proficiently that a variation even approaching the allowable variation of ¼ in. in 10 ft. was very rare.

For the purpose of checking the finished surface, an Olsen-Andrew surface rater was used by the inspector. This surface rater is a very simple and efficient type of rolling straight-edge, showing the variations, high and low, by means of a needle indicator. When the maximum allowable variation is reached, a scraper engages with the paving surface. This checking was done immediately behind the cross-rolling while the surface was still warm enough to permit irregularities to be rolled out. The finish was considerably above the average for black-top pavements.

The utility crew pulled the forms as soon as the surface course had cooled. A novel and labor-saving method of form-pulling was employed. A fairly heavy timber was placed across the body of a 3-ton dump truck equipped with standard hydraulic hoist and a heavy hook was suspended from this timber by a steel cable. The truck was driven along the edge of the pavement so that the timber extended out over the form. The hook was engaged under the upper flange of the form near one end, power applied to the hoist and the form lifted clear. This method is rather hard on forms but enables a crew of three men to pull better than 1,000 lin.ft. of forms per hour.

Shoulders—Wherever practicable, the grade line was laid to provide shoulder material from the subgrade on account of its superior quality. At all other places shoulder material was excavated from borrowpits by a small shovel, loaded into dump trucks and deposited in piles along the shoulders. It was then struck off by a road machine with a special mold-board extension, after which the shoulders were brought to line and grade by hand. Shoulders were built practically flat and approximately 1 in. high to provide for settlement.

Forces—The forces, under a general superintendent,

TABLE I—COMPOSITION OF ASPHALTIC-LIMESTONE MIXTURES FOR ALABAMA HIGHWAY

Base Mixture	Per Cent	Surface-Course Mixture	Per Cent
Bitumen	5.1	Bitumen	9.2
Passing 200-mesh	4.0	Passing 200-mesh	14.2
Passing 80-mesh	7.5	Passing 80-mesh	9.5
Passing 40-mesh	20.1	Passing 40-mesh	26.1
Passing 10-mesh	11.0	Passing 20-mesh	15.0
Passing ½-in. screen	7.2	Passing 10-mesh	14.4
Passing ¾-in. screen	25.0	Passing ½-in. screen	8.6
Passing 1½-in. screen	20.1	Passing ¾-in. screen	3.0

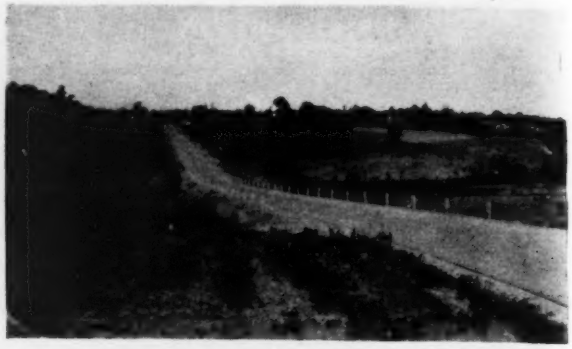
were as follows: a plant crew consisting of one foreman, one shovel operator, one crane operator, two firemen, one oiler, two batchers, one mixer man and eight laborers; a form crew consisting of one foreman and twelve laborers; a subgrade crew consisting of one foreman, one tractor driver, one roller man, one machine man and eight laborers; a paving crew consisting of one foreman, two roller men, one tractor driver, three rakers, two tampers and four laborers; ten to twenty truck drivers; a repair crew consisting of one mechanic and three helpers, and a general utility crew consisting of one sub-foreman and from four to seven laborers. The organization was excellent, each foreman being thoroughly competent, taking a pride in his work and handling his forces in such a way as to secure maximum production and quality.

Engineering and Inspection

A three-line profile (center line and each edge of pavement) was run on the old chert surface and platted to a horizontal scale of 100 ft. to the inch and a vertical scale of 2 ft. to the inch, on which the paving grades were laid down. The exaggerated vertical scale was of great assistance in securing an economical grade line.

Stakes were set at intervals of 25 ft. and at a distance of 14 ft. from the center line on each side, and driven to form grade. A track line was then run on one side from which the form intervals were set.

Curves of 6 deg. and over were widened 2 ft. on the inside edge from P.C. to P.T., returning to normal 18-ft. width at points 100 ft. back of the P.C. and ahead of the P.T. Widening was accomplished by using a false form on the normal form line for the spreader to run on, pulling each section as soon as it was cleared



COMPLETED LIMESTONE ASPHALT ROAD IN ALABAMA

by the spreader and filling by hand the widened area. By this method the rollers had a monolithic surface on which to work, overcoming the disadvantage and poor appearance of a joint on the normal 9-ft. line. Both courses were handled in the same manner, using 4-in. steel forms and 4x4-in. timbers, 10 ft. long, for the false form for base and 2x4-in. timbers, laid flat, for the top.

All curves from 0 deg. 20 min. up to 6 deg. 30 min. (the maximum degree of curvature) were superelevated, using 0.3 ft. for the 20-min. curve, 0.4 ft. for the 30-min. curve, and adding 0.1 ft. for each 30-min. increase in the degree of curvature for the normal 18-ft. width; widened sections were increased in proportion. All curves were given full superelevation from P.C. to P.T., the transition from full superelevation to normal flat section taking place in the following distances:

Degree of Curve	Length of Runoff
0 deg. 20 min. to 0 deg. 30 min.	150 ft.
1 deg. 00 min. to 3 deg. 00 min.	200 ft.
3 deg. 30 min. to 6 deg. 30 min.	300 ft.

This scale of superelevation has proved its efficiency by demonstrating that it will hold a vehicle, without the slightest difficulty of steering, at as high a rate of speed as can be used on the tangents. The writer has seen it tested as high as 75 miles per hour on the maximum curve.

All bridges have a 20-ft. clear roadway between curbs, and the paving is flared on each side to meet the curb lines.

A total of 193 cores was cut at intervals of approximately 500 ft., giving an average total thickness of 4.5228 in., or 3.0202 in. for base and 1.5026 in. for surface. Cores were cut under the direction of the state testing engineer by a shot drill mounted on a truck.

General Supervision

The work was performed under the general supervision of H. D. Burnum, division engineer, of Decatur, and R. S. Hale, testing engineer, of Montgomery, for the state, and S. S. Newell, vice-president of the Newell Contracting Co., of Birmingham, for the contractor. Federal inspection was handled by H. C. Wells, senior highway engineer, W. G. White, assistant highway engineer and H. C. Headley, materials engineer, all of Montgomery, for the U. S. Bureau of Public Roads.

The project personnel consisted of F. A. Salmon, resident engineer, T. O. Earley, plant inspector, H. J. Kernachan, street inspector, and F. H. Holtsford, assistant street inspector, for the state, and A. L. Burris, superintendent, for the contractor.

Highway Research
as an International Problem

Worldwide Demand for Improved Roads Creates an Urgent Need for Free Interchange of Scientific Data—Low-Cost Types of Great Importance

By Dimitri P. Krynine
Research Associate in Soil Mechanics, Yale University; Formerly Professor of Highway Engineering, Moscow, Russia

ONLY a few years ago highway engineering was based entirely on rule-of-thumb—practical knowledge as to procedure, which had been handed down from one generation of highway builders to another. The value of these rules should not be disparaged; many of them were wise and useful, as witness certain Roman highways which have survived the Dark Ages and even yet are in more or less satisfactory condition. Today, however, changed conditions find empirical rules inadequate. The large increase in modern traffic, with consequent rapid development of the highway industry; the enormous influence of good roads on the economics of a given country; and the natural desire to avoid useless expense have forced the modern highway engineer to search for and develop scientific principles upon which to base his designs. The present-day road builder has abandoned the empirical method and adopted scientific research. Something parallel occurred in the history of science when modern chemistry replaced the old alchemy.

Highway research is only fifteen or twenty years old, yet its importance is universally acknowledged by all progressive nations. The fact is generally recognized that two roads, perfectly analagous in respect to their economic or administrative value, must often be constructed by totally different methods owing to their location in different climatic zones, with changed geological and soil factors, and under varying drainage and underground water conditions. While determination of the most effective and efficient methods of construction under given conditions is a problem to which research has already supplied an answer for many road-building organizations, the widest interchange of such information is necessary, not only to benefit other engineers facing similar problems, but also to accelerate the building up of a modern highway technology of universal value.

Research Problems

The not inconsiderable accomplishments of highway research during the past few years have been but a beginning. Much work remains to be done. The influence of climatic conditions upon pavements is a case in point. Temperature, either as extreme heat or cold, affects every step of road work. Heat causes blow-ups of concrete and brick roads; it softens tar and asphalt. Extreme frost damages the highway subgrade, interfering with drainage devices and causing heaving, sometimes to such an extent as to destroy the pavement completely. An example of the difficult conditions that may be encountered by a highway engineer unfamiliar with local soil conditions occurs in Siberia. Permanently frozen ground is found over a large portion of this territory, an area equal to about half that of Europe and extending south of the Chinese frontier. Although the upper layer of this soil thaws during the summer, below a certain depth its temperature is always under the freezing point. For example, in Poustozersk the frozen depth extends 58 ft., in Taldan 220 ft., and in Yanoutsk it exceeds 350 ft. Permanently frozen soil is as hard as rock, but under masonry structures (since masonry is a fair conductor of heat) it thaws, the originally hard surface becomes soft, and failure often follows. Road constructed in such a country can never be considered as stable; even wooden bridges suffer from frost heaving. Unusual construction difficulties are also encountered in hot countries. A consulting engineer accustomed to highway work in a temperate climate cannot go to a tropical country and there apply his specifications. To do so will probably result either in unsatisfactory results or in a useless waste of money.

This being so, it is easy to understand why the highway engineer desires to encourage the study of climatology and meteorology as applied to his field. Those who assisted at the last meeting of the Highway Research Board in Washington, D. C., in December, 1929, have learned with pleasure that the board and its committee on structural design of roads have initiated research in a new branch of highway science, the study of climatic conditions as applied to roads and highways. A similar study is being carried on in the Russian Highway Research Bureau. Further details will be found in the author's "Textbook on Highway Engineering," Russian edition of 1929.

Earth Road Problems

In designing a highway it is necessary to consider not only natural conditions but also the character of the prevailing traffic. The splendid tar-treated gravel roads of Massachusetts or Connecticut would not be suitable, for example, in Russia. The latter country, with about 2,000,000 miles of road (of which only about 13,000 miles have stone surfacing), possesses hardly 20,000 automobiles. A tar-treated gravel surface, cheap and convenient for automobiles, would be badly damaged by the shoes of Russian horses in a few days. These figures characterizing Russian road transportation introduce the necessity of studying the problem of earth roads, which must predominate in most parts of the world for many years to come. In Central and South America, for example, the smaller and less wealthy nations must, for economic reasons, develop a cheap type of road suitable to climatic and other local conditions. In the flatter sections where corn, wheat and other crops are ripening and require transportation to market, earth roads constructed by graders, perhaps with admixtures of soils, will probably be the accepted solution. Expensive projects cannot be wholly eliminated, however, due to

the difficult topographic conditions. On the Highway-to-the-Sea in the republic of Colombia for a stretch of about 70 miles excavation averaged about 200,000 cu.yd. per mile, which is believed to be without a parallel in either railway or highway work.

Mexico, the nearest of the Hispano-American republics, is a very interesting country to the highway engineer. Road mileage totals about 72,000 miles, of which about one-fifth is classed as good. The country contains about 45,000 cars and trucks, which gives a rate of about 0.6 automobiles per mile of road as compared with the American standard of over seven automobiles per mile. Mexico has large possibilities for highway development and is an excellent example of the necessity for serious scientific research. Mexican soils seem to be peculiar, and the country possesses different petroleum products in abundance. A favorable combination of these elements, or a combination with stone, which is also available, should give good results. The country needs the organization of good highway research facilities in order to spend efficiently the $40,000,000 which is to be used in the five-year road program now under development. In this connection it is interesting to note that the Russian five-year plan proposes the expenditure of about $250,000,000 for road construction and maintenance, approximately the same expenditure per inhabitant as in Mexico.

The Coming Road Congress

While research problems have been extensively discussed at the five previous meetings of the International Road Congress, the important factor of soil research in connection with earth road construction and maintenance will, at the request of the Russian delegates, be considered for the first time at the sixth meeting to be held in Washington, D. C., this month. It is a significant coincidence that this subject will first be discussed in a country where soil research is well advanced. The present meeting provides an excellent opportunity for the co-ordination of research results, not only in this particular field, but also in others affecting highway construction and maintenance. On a small scale, such an interchange of results is carried on in the United States by the Highway Research Board; it now seems opportune to organize a body which will perform the same function on an international basis. This problem can be attacked and solved only by an International Road Congress, having due authority the world over. It is obvious that, in collecting such data, one of the first problems which must be attacked will be the influence of climatic and other local conditions upon roads. The world is divided into several zones, in each of which general principles and standards must be considered as a unit.

Treated Piles Reinstalled After 38 Years

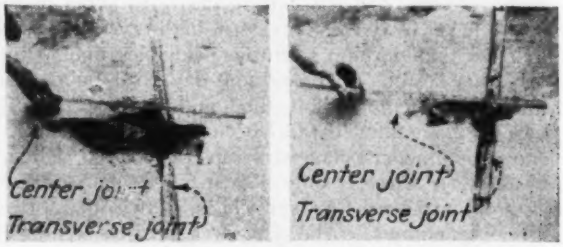
Creosoted timber piling which has already seen 38 years of service in water badly infested with marine borers has recently been placed in the remodeled pier of the Los Angeles (Calif.) Playground Commission, according to a recent issue of *Wood Preserving News*. The piles were treated at the San Pedro plant of the Southern Pacific Railroad Co. in 1889. The preservative used was a pure coal-tar distillate; treatment was to refusal, with a final retention of 14.17 lb. per cubic foot. First installed in the Santa Monica long wharf of the Southern Pacific Railroad in 1891 and 1892, the piles remained in service until 1916, when the wharf was dismantled. Some of the salvaged piles were then re-used in the foundations of the municipal auditorium for the city of Ocean Park, now a part of Santa Monica; others were placed in the foundations of one wing of Sunset Pier in Venice, now part of Los Angeles. When a section of the Sunset Pier was rebuilt in 1929, it was necessary to remove a number of the piles, which were found to be in such good condition that they were held for further use.

Lightning Strikes Concrete Pavement in Georgia

By Searcy B. Slack

Bridge Engineer, State Highway Board of Georgia, East Point

ON THE afternoon of Sept. 11, 1930, lightning struck a concrete pavement between Griffin and Thomaston, Ga., on state route No. 3. This project is being built with federal aid and the contractor had completed about 9,000 ft. of paving. The paving is 20 ft. wide and has a 16-gage metal center joint with ½-in.



LIGHTNING STRIKES PAVEMENT

At left—Point where lightning struck. The hole goes entirely through the pavement. The black area at the left is the metal center joint. At right—Transverse joint and center joint 300 ft. from where lightning struck. About twenty holes of this kind were knocked out at intersections of transverse and center joints.

dowels through the joints 4 ft. center to center. The transverse joints are at 50-ft. intervals and are of ½-in. premolded asphaltic material. Dowels extend through the joints in the usual way. The bolt of lightning struck the pavement in the center at a transverse joint 1,400 ft. from the end of the job. A hole was knocked entirely through the pavement and a duck's nest of concrete was shattered out. The lightning traveled along the metal center joint 1,300 ft. in one direction and about 4,000 ft. in the other. It apparently arced over the transverse joints, knocking out small chunks of concrete on each side of them. At some of the joints arcing occurred at the top of the pavement, and it is presumed that at the other joints arcing occurred underneath the pavement, as there was a skip of several transverse joints where the pavement was affected on top.

About 150 ft. from the point where the bolt of lightning struck the pavement two men stood on the ground under a filling station shed and a man and woman were seated inside the filling station. The two men standing under the shed were knocked down by the shock, while the man and woman inside the station received no shock. The man in the filling station reports that he saw the lightning strike the pavement and saw a ball of fire roll along the center of the pavement.

Erection of 276-Ft. Towers for Mid-Hudson Suspension Bridge at Poughkeepsie

Lower Steel Placed and Traveler Assembled by Derrick Boat—Creeper Traveler Handles 45-Ton Column Sections—Steel Fabricated for Minimum of Field Riveting

By John T. Martin
Field Engineer, American Bridge Co.

NOTABLE FEATURES in the erection of the two towers of the Mid-Hudson suspension bridge recently opened between Poughkeepsie and Highland, N. Y., were: the rearrangement of shop riveting and the fabrication of large column sections to minimize the amount of field riveting; the design of a traveler with sufficient capacity to handle 45-ton sections, yet light enough to be easily moved; and the use of the traveler for work subsequent to the tower erection. The suspension bridge is a highway structure with a 1,495-ft. center span and suspended side spans of 750 and 755 ft. respectively. Each of the two cables, 16¾ in. in diameter, is made up of nineteen strands of 320 wires—a total of 6,080 wires per cable.

The stiffening structure is of the through-truss type, carrying a 30-ft. roadway and two 4½-ft. sidewalks. The towers are 276.45 ft. high, measured from top of pier, (El. 35) to bottom of saddle casting (El. 311.45) For lateral stability the two legs of each tower, which are composed of plates and angles riveted together to form a closed cross-section, are crossbraced above and below the roadway level.

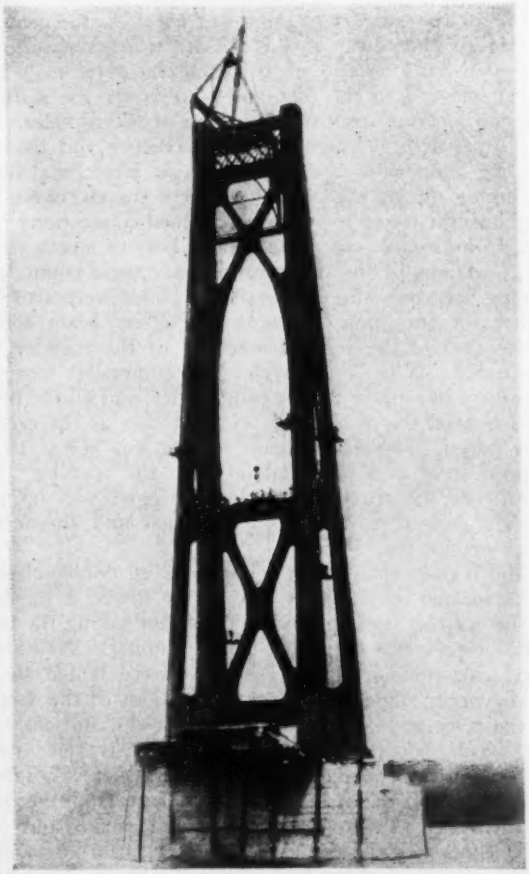


FIG. 1—WEST TOWER, MID-HUDSON SUSPENSION BRIDGE, POUGHKEEPSIE, N. Y.

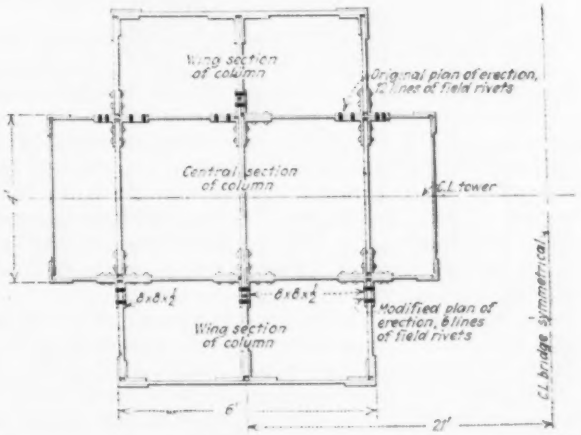


FIG. 2—CROSS-SECTION OF TOWER LEG
Showing how original plan of twelve lines of field rivets in each wing section was modified to six lines of field rivets.

The erection equipment for each tower consisted of an A-frame derrick supported on a steel framework which was bolted to the towers at different heights as the erection proceeded. The traveler was located on the shore side of the tower in each case, in order to help, in a measure, the temporary deflection of the towers toward the shore—required in order that they would assume proper relation to the vertical when the full dead-load was on the bridge.

The largest sections of column erected by the travelers were 32 ft. long and weighed 45 tons. These formed the sixth section of main column above the pier level. This feature and a change in the original detail, by which the three pairs of angles forming the vertical splice between the central and wing sections of column were shop-riveted to the central section with ¼-in. clearance for entering the three webs of the wing sections, resulted in a saving in the number of field rivets as can be seen in Fig. 2. There were only 25 field rivets per ton of steel.

Both towers are located several hundred feet from the respective shores, which suggested derrick-boat erection of the base sections, the lower sections of column and the creeper travelers. The fact that the heaviest sections of base weighed 50 tons and that a column section with upper splice at 96 ft. above mean low water had to be erected before the creeper underframe could be bolted to the tower in its first position necessitated the use of a heavy derrick boat. The "Colossus" of the Merritt-Chapman & Scott Corp., having a boom 120 ft. long and a lifting capacity of 90 tons, was used for this portion of the work. The derrick boat erected approximately 600 tons of steel in each tower, in addition to the creeper

traveler and an engine platform. It also placed the hoisting engines on the platform. The traveler and its supporting framework were assembled in sections on the deck of the lighter so that the number of lifts required to place it on the tower in its first position was reduced to a minimum.

All steel was transported by barge from Greenville Piers, N. J., 5 miles from the bridge site, where it had been in storage since the summer of 1927. The tipping of the caisson of the east tower foundation in July of that year delayed the start of erection of the towers about a year and a half (see *Engineering News-Record*, August 4, 1927, p. 194), so that work was not actually begun until April 22, 1929.

Traveler Design—In the design of the traveler, the A-frame type of derrick was used instead of the stiff-leg type for two reasons: If the stiff-leg type had been used, one stiff-leg would have been in tension and one in compression while setting most of the tower members. This would have produced opposite bending stresses in the two tower legs at the same time, which would have caused warping in the tower and would have possibly made it difficult to connect the transverse bracing between the tower legs. Using the A-frame type of traveler avoided this difficulty. The second reason for using the A-frame type of derrick was that, with minor alterations, the A-frame assembly, the rear stiff-leg, the front cross-girder and the center longitudinal girder of the traveler used in erecting the Carquinez Straits bridge in California could be adapted to the design of the traveler for the Mid-Hudson bridge. Practically the only new material required was the supporting underframe.

The foot of boom was placed 15 ft. 4½ in. from the transverse center line of the tower. This provided clearance between the A-frame legs and the boom when the wing sections of the column nearest the A-frame were set. The spread of the A-frame legs was 31 ft. 9 in., permitting simple details in connecting the top and bottom struts of the traveler to the tower legs. As the center to center of the tower legs is 42 ft., a 70-ft. boom was found to be long enough to reach the outer edge of a barge moored to the pier and also to set the different column sections from each position of the traveler.

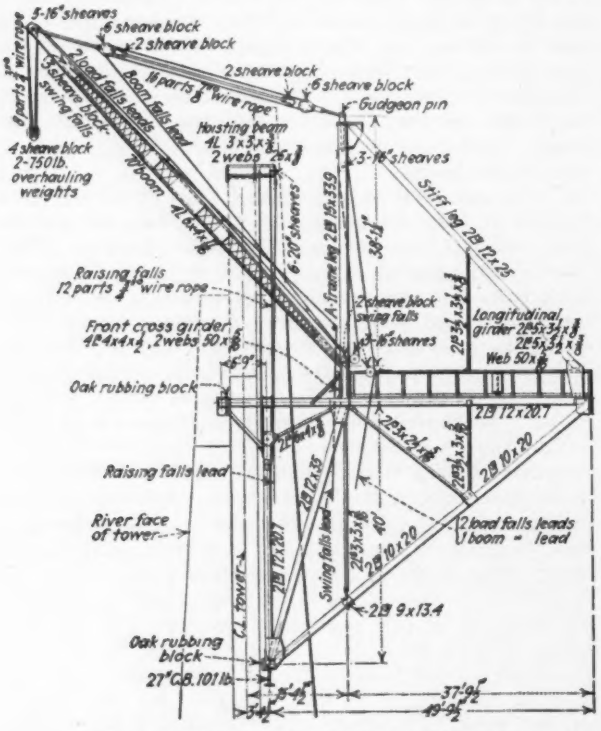


FIG. 3—DETAILS OF ERECTION TRAVELER

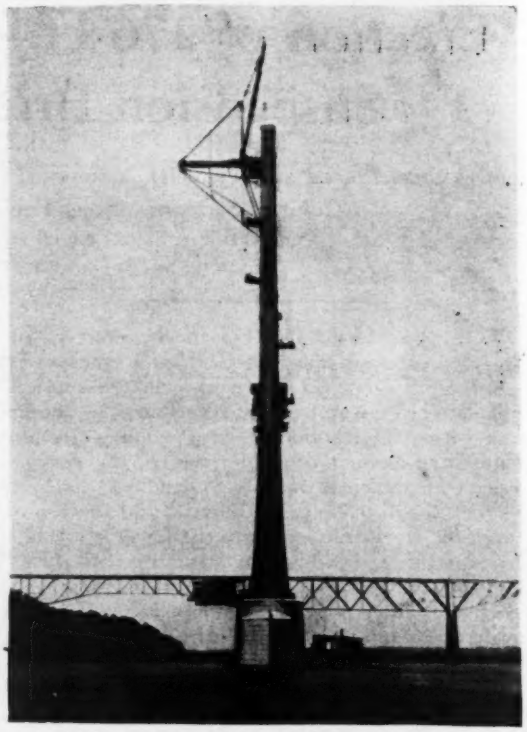


FIG. 4—SIDE VIEW OF WEST TOWER, ERECTION COMPLETE

The structural make-up of the creeper and the supporting framework is shown in Fig. 3. Horizontal forces occurring during the operation of the traveler were carried into the tower by means of framed connections from the 15-in. double-channel top and bottom struts to the wing sections of the column, holes for these connections having been provided in the shop. Holes were also provided for the connections of the 27-in. beam section which carried the vertical reactions of the traveler into the tower. When the traveler was jumped it was only necessary to remove the framing angles, and all the members cleared the rivet heads of the tower as the creeper was raised. The 27-in. beam section was bolted to the bottom strut and raised along with the traveler. The weight of the traveler completely rigged was 63 tons and the deflection of the towers toward land, due to this dead weight, was 1½ in.

The bottom channel strut and a 12-in. double-channel strut, located on the river side of the tower at the level of the traveler deck, provided means for taking the horizontal forces into the tower when jumping. Well-lubricated oak rubbing strips, 2½x6 in., were bolted to the inside corner angles of the central sections of the column on the river and shore faces of the towers, and oak rubbing blocks bolted to the top and bottom traveler struts tracked on the rubbing strips as the traveler was raised. The use of the oak strips was a departure from the ordinary practice of using steel rollers and worked out very well. Steel rollers were used, however, in order to keep the traveler aligned transversely of the bridge during the process of raising.

Two sets of falls, each composed of twelve parts of ¾-in. wire rope, were used in raising the traveler. The top blocks were built into two hoisting beams bolted to the top splice of the last central section of column erected previous to the jumping. The lower blocks were built into the two vertical posts of the supporting underframe. It required only six hours to disconnect the traveler from one position, raise it, and complete bolting it to the tower in its next position ready to set steel. The traveler was raised seven times.

A two-drum, 80-hp. electric hoist was used in operating the two sets of raising falls, and a three-drum, 175-hp. electric hoist was used in operating the lead line and the becket end of the load falls and the lead line of the boom falls. These hoists were located on an engine platform, supported by four 30-in. beam sections 50 ft. long, cantilevered over the edge of the pier. The upward reaction at the pier end of the beams was resisted by two 24-in. I-beams framed between the bases of the tower columns. The electric motors on the hoists were of the alternating current type, 60-cycle, 3-phase current being supplied by means of submarine cables from the east and west shores to the respective piers.

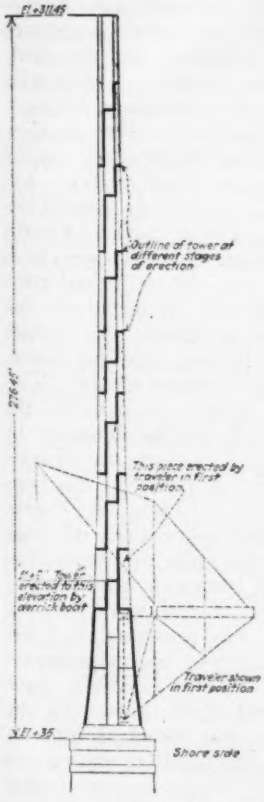

El. +311.45
Outline of tower at different stages of erection
276.45'
This piece erected by traveler in first position
Piece erected by elevation by derrick boat
Traveler shown in first position
El. +35
Shore side

FIG. 5—ELEVATION OF TOWER, SHOWING OUTLINE AT DIFFERENT ERECTION STAGES

Erection Procedure—The heavy lines in Fig. 5 show the outline of the towers at the completion of different stages of erection. The traveler is shown in its first erected position as placed by the derrick boat. From this position only one section of column was erected in each tower leg. From the other positions the traveler erected three sections in each tower leg, in addition to pieces of batter column and bracing as the work proceeded. The bracing had to be set after the traveler deck got above the space to be occupied by that particular bracing, on account of the sway rods of the traveler lying between the tower legs at the level of the traveler deck. When the traveler reached its last position, the 12-in. double-channel strut on the river face of the tower was removed in order to provide space for the erection of the tower bracing at the top.

The travelers were left in their last position where they played an important part in erecting the footwalk ropes, the footwalk panels, and the steel gallows frames for the cable spinning. They were also used to take down this temporary equipment, to erect the first three panels of stiffening truss on the river side of the towers, to assemble both the middle and side-span deck travelers, and to aid in erecting the suspender ropes. After the shore-span travelers reached the land and could no longer pick the stiffening truss steel from barges, the tower travelers hoisted this steel to the roadway level at the towers, and truss members were run out to the deck traveler on push cars. As a last operation, the deck travelers were dismantled by the tower travelers.

FIG. 6—TRAVELER ERECTED COMPLETE EXCEPT FOR REEVING UP

Riveting—The rivets were 1 in. in the main column sections and ⅞ in. in the batter sections and bracing. Riveting and fitting up were done from steel scaffolds. The heaters were located on the scaffolds, except at the first few splices above the piers and at points where there were communicating manholes between the different compartments of the tower. These manholes were located at the bottom of the tower, at the roadway level, at the lower end of the upper crossbracing and at the top. At these points rivets were dropped from one level to another through 3-in. flexible metal tubing. The scaffolds were moved from point to point by the tower traveler. Two scaffolds on the east tower were suspended from the tower top by means of wire hoisting rope leading to the two-drum electric hoist after the traveler had been raised to its last position. Two other scaffolds were hung from the stiffening truss tower brackets by means of 1½-in. manila lines leading to spools on the hoisting engine. This increased the mobility of the scaffolds and effected a saving of time in moving from one point to another. Riveting was not begun until practically all the tower steel was in place. This was done in order to eliminate the hazard of working the riveting gangs beneath the raising gangs.

The total number of field rivets in one tower was 52,000. Of these 48,000 were 1-in. and 4,000 were ⅞-in. The average number of rivets driven per gang per day was 200.

Time of Erection—The erection of the west tower was begun April 22 and was completed July 3, 1929. The east pier was completed June 8. Erection of steel on the east tower was begun June 13 and was completed Aug. 19. Of the 2,000 tons of steel in each tower, approximately 600 tons were erected by derrick boat and 1,400 tons by traveler.

Organization—The bridge was built as a toll structure by the state of New York under the direction of Col. Frederick Stuart Greene, superintendent of the department of public works. Modjeski and Moran were the consulting engineers for the state with C. W. Hanson as resident engineer. The American Bridge Co. was the general contractor for the superstructure and the completion of the anchorages. The towers were fabricated at the Ambridge plant of the company and were erected by the Eastern division erecting department; J. B. Gemberling, manager; H. H. Starr, assistant engineer, in charge; W. James Ward, superintendent; and the writer as field engineer.

Roadmasters' Convention Reports on Track-Maintenance Work

Papers Read on Rail Renewal on Busy Tracks, Power Tools and Use of Motor Trucks Instead of Work Trains

WITH ONLY ten subjects on its program the Chicago convention of the Roadmasters' and Maintenance-of-Way Association, held Sept. 16-18, was well occupied during its five well-attended sessions, owing to the brisk and comprehensive discussions on some of these subjects.

Rail Renewal and Motor Trucks—Modern practice in renewing rails on the Pennsylvania Railroad was described by R. W. E. Bowler, division engineer, who considered that on multiple-track lines, even under heavy traffic, it is practicable to give up a stretch of one track for eight-hour periods. The distribution and application of new material and loading of old material are all done during this one occupancy of the track, with a saving of 50 per cent of the time required when these three operations are done at three different intervals. Track maintenance as affected by signal operation was discussed by J. A. Peabody, signal engineer of the Chicago & Northwestern Railway, who pointed out the need for greater co-operation between the track and signal forces in regard to effective maintenance of such parts as switches and insulated joints. Mr. Shea, assistant engineer of maintenance-of-way of the Chicago, Milwaukee, St. Paul & Pacific Railway, stated that on his road the section foremen and signal maintainers make frequent inspections jointly and that similar inspections are made by the road-masters accompanied by the signal inspectors.

Developments in drainage of wet spots in track as permanent assistance in reducing the cost of maintenance, particularly on multiple-track lines and in large yards requiring long drains, were reviewed by J. A. Snyder, division engineer, Michigan Central Railroad. Rockfill drains, clay tile, sewer pipe and perforated iron were included. That motor trucks (on highways) may be used to advantage by the track department was shown by O. Suprenant, roadmaster of the Delaware & Hudson. These trucks serve as substitutes for work trains in transporting men and materials, especially at large terminals where the operation of work trains and track cars is practically impossible. Several roads are using motor-truck service for the track, signal, stores, bridge and building departments. In the discussion one member referred to satisfactory and economical results with rented cars, but the general preference was for company-owned equipment. In a review of European practice in track construction and maintenance by J. V. Neubert, chief engineer of maintenance-of-way, New York Central, an interesting point was the renewal of track in rail-length units by means of special cranes.

Distribution of Track Forces—A favorable report by P. J. McAndrews, Chicago & Northwestern Railway, on the practicability of distributing track forces on the basis of equation of track mileage was followed by the presentation of widely differing opinions. The rule adopted by the American Railway Engineering Association was cited, together with actual practice on a number of roads, but the principal opposing arguments were based on the varying conditions of individual track sections and the great number of factors to be considered, such as weight and age of rail, track condition, road crossings, yards and drainage, so that personal judgment must be the real basis. On the other hand, the report was sustained by those who use equating systems and consider them as useful guides to assist judgment.

The greater difficulty of maintenance in busy freight yards as compared with main-line tracks was pointed out by Mr. McAndrews, who stated that while the former ordinarily required much more work, this work and its cost can be greatly reduced by greater co-operation with the operating force and the more extensive use of power equipment. His general conclusions suggested the wider use of cost-accounting methods and the establishment of a workable equation of mileage units as a basis for the distribution of track-maintenance forces.

Changes in Maintenance Conditions—That modern heavy and well-built track carrying heavy traffic cannot be maintained economically by hand-tool methods was emphasized in an address by Lem Adams, general supervisor of maintenance-of-way, Union Pacific. On the other hand, to equip all section gangs with power tools would involve prohibitive cost and the individual tools would be used only occasionally. He predicted the use of well-equipped special gangs to handle the heavier work on long stretches of line, leaving only the inspection and minor work for small section gangs. This plan has been introduced with success on parts of the Chicago, Milwaukee, St. Paul & Pacific Railway by William Shea, assistant engineer of maintenance-of-way. But that it will be successful on heavy-traffic main lines was doubted by P. J. McAndrews, Chicago & Northwestern, for the reason that the heavy kind of track work is needed continually under such conditions and must not be left until a special gang can handle it.

The related subject of the division of work between section gangs and extra gangs was presented in a report by R. L. Sims, district engineer of maintenance, Chicago, Burlington & Quincy Railroad. While some roads are tending toward extending the duties of the latter, he expressed the opinion that the work and responsibility should be mainly in the hands of the section foremen. How to get the best work from labor-saving equipment was discussed in a report by W. O. Frame, district engineer of maintenance, Chicago, Burlington & Quincy Railroad. He showed the necessity of preparing careful programs for machine work in order to use the machines intensively and of educating the men who operate the machines, both as to the economy of the new methods and the proper handling of the machines.

As president for 1930-31, the association elected Elmer T. Howson, Western editor of *Railway Age*, with C. W. Baldridge, assistant engineer, Santa Fe Railway, and J. J. Desmond, division engineer, Illinois Central Railroad, as vice-presidents. The secretary is T. F. Donahoe, general supervisor, Baltimore & Ohio Railroad, Pittsburgh, Pa. It was voted to hold the next meeting at Chicago in 1931.

Expenditures by Class I Railroads

Capital expenditures made by the class I railroads of this country in the first six months of 1930 for new equipment and additions and betterments to railway property totaled $468,305,000. This is an increase of $118,000,000 over similar expenditures for the same period in 1929.

N.E.W.W.A. Holds 49th Annual Meeting

Topics Treated Include Flow Through Service Pipes, Purification, and Pipe Manufacturing Methods—Water Supply Problems of Northern New Jersey

Engineering News-Record Staff Report

TWELVE formal papers, a number of committee reports, a superintendents' session and an all-day inspection trip comprised the main features at the 49th annual meeting of the New England Water Works Association, held September 23-26 at Atlantic City, N. J. Registration at the meeting totaled 381. Unfortunately, the program was so arranged that the business meeting was the only gathering scheduled for the last day of the convention. This resulted in such a light attendance that the outgoing president, Robert Spurr Weston, presented his address by title only. New officers were elected as follows: president, George H. Finneran; vice-president, Richard H. Ellis; directors, Howard M. King and Henry F. Hughes. Albert L. Sawyer was re-elected treasurer. The Dexter Brockett medal was awarded to R. A. Cairns, city engineer, Waterbury, Conn., for his paper on the Shepaug tunnel, published in the *Journal* of the association for September, 1929.

A number of exhibits were shown by members of the Water Works Manufacturers Association, Inc., which also arranged an all-day inspection trip on Wednesday, Sept. 24, to the plants of R. D. Wood & Co. and the U. S. Pipe & Foundry Co., at Florence and Burlington, N. J. Pipe casting by the sand-spun and deLavaud centrifugal processes, as well as by the time-tried vertical sand cast method, was watched by approximately 150 persons who took the trip. Other processes inspected included the manufacture of hydrants and the application of bitumastic lining to the interior of cast-iron pipe.

New Jersey's Water Supply

As might be expected, a considerable portion of the program was devoted to papers dealing with water supply problems of New Jersey. The northern section of the state, being the most densely populated, received the major portion of attention, although the shore district was represented by Lincoln Van Gilder, engineer and superintendent of the Atlantic City water works, who described the artesian and surface supplies for the resort. Water supply for Atlantic City is complicated by the fact that the permanent population, according to the 1930 census, is 65,748, with an additional transient population estimated at a maximum of 300,000. However, many of the larger hotels have their own private wells extending to a water bearing stratum 850 ft. below sea level. Originally these were flowing wells, but the large draft has lowered the water level so that the present pumping level is now 90 ft. below the surface. By a special arrangement between the city and the hotel owners these private wells and the hotel power plants are instantly available for fire use at any time throughout the year.

The general water supply situation of northern New Jersey was outlined by Morris R. Sherrerd, chief engineer of the New Jersey State Water Policy Commission, who showed by means of a large map the watershed areas in the northern section of the state which have been developed or are available for development. As the water consumption in this district increases the plan is to develop successively a series of parallel basins extending west to the Delaware River. These will have an ultimate production of 600 m.g.d. An interesting feature is that each basin is at a slightly higher elevation than its neighbor to the east, which will be taken advantage of in supplying consuming areas by gravity.

The most recent of these supplies to be developed, the Wanaque system, was described in a paper by Arthur H. Pratt, consulting engineer for the North Jersey District Water Supply Commission. The Wanaque reservoir, which is supplied from an area of 94 square miles, supplies approximately 100 m.g.d. to Newark and seven additional municipalities in the metropolitan district. Development required the construction of the Raymond dam, an earth dam with concrete core wall, and of the Wanaque aqueduct, extending from the dam at Midvale to a point just north of Newark. For the first 1,600 ft. of its length the aqueduct is 84 in. in diameter, partly of reinforced concrete and partly of steel. Below this section there are two 74-in. pipe lines for a distance of 14 miles, and a second one of the same size for six miles, mostly of steel. Details of the construction of both dam and aqueduct were shown by means of lantern slides.

Methods employed in the disinfection of the Wanaque aqueduct were described in a paper by Attmore E. Griffin, analyst for the North Jersey District Water Supply Commission. Contrary to the usual practice heretofore, the continuous displacement method was used instead of applying the disinfectant to the aqueduct with flow shut off and allowing the water and disinfectant to stand for some hours. Liquid chlorine was used, this being substituted for hypochlorite of sodium at the request of the contractor. When the aqueduct was completed, its bottom was swept clean and a portion with an arc of 18 in. was painted to restore the coating where damaged by the workmen. Liquid chlorine was added at the upper end at successive rates of 8, 4 and 2 parts per million to water flowing through at the rate of 10 m.g.d., the capacity of the aqueduct at the upper end being 100 m.g.d. The quantity of chlorine in the water discharged at the lower end was 3 p.p.m. The journey of the water through the 20½ miles of aqueduct took 5 days, 4 hours and 45 minutes.

Flow Through Service Pipes

Results of a remarkable series of tests on the effect of passing large volumes of water through service pipes of various materials were outlined by means of lantern slide diagrams by Prof. Gordon M. Fair, of Harvard University. This was a joint study by Professor Fair, Prof. M. C. Whipple and C. Y. Shaw, the latter a research associate in the Harvard Engineering School who carried on most of the tests. The object was to show the effect of the discharge of a large volume of water through the pipe on diameter and carrying capacity, the assumption being that this reduction in capacity was affected by the volume of water passed, rather than by the length of time the pipe was in use. Seven kinds of pipe, in batteries of three, were set up in the water filtration plant of Cambridge, Mass. One line of pipe of each kind was

1½ in. in diameter and carried cold water, while the other two lines were each ¾ in. in diameter, one carrying water varying with the seasonal temperature (36 to 77 deg. F.) and the other hot water of a temperature of approximately 145 deg. F. Each of the 21 runs of pipe was 100 ft. in length and each had a piezometer 10 ft. from either end. Materials tested included copper, red brass (about 85 per cent copper, 15 per cent zinc), admiralty metal (zinc and tin), galvanized wrought iron, galvanized steel, and plain unprotected wrought iron and steel. The water was not recirculated. Connections at each end of each run of pipe were made with rubber hose to avoid setting up electrical action. The total volume of water conveyed through some of the pipe was as much as 900,000 cu.ft. Results in diminished carrying capacity of the pipe were expressed in terms of *C* in the Hazen-Williams formula.

Pipe Manufacturing Methods

A paper on "How Small Cast-Iron Pipe Is Made and Used" was read by J. R. McWane, president of the McWane Cast Iron Pipe Co., Birmingham, Ala. Ten years ago the author conceived the idea of bringing back the use of small cast-iron pipe, gradually displaced by steel, and making the cast-iron pipe available at no greater cost than that of steel. Investigation at that time showed that in Germany cast-iron pipe was available up to lengths of 16 ft. It can now be had in this country up to 18 ft. or more in length. The small cast-iron pipe made by the author of the paper is extensively used for service connections. It is also being used for small piping in filter plants and on golf courses and in cemeteries where irrigation is practiced. Cast-iron pipe 2 or 3 in. in diameter is now being used more and more for street mains; generally considered as of temporary use but sometimes continued for a long time. If and when larger mains are used the small pipe can be taken up and relaid. Hundreds of thousands of feet of small cast-iron pipe are also being used for high pressure gas lines.

New developments in the manufacture of wrought iron which make it possible to substitute machines for the old hand puddling process without detriment to the product were described in a paper and motion picture presented by James Aston, consulting metallurgist for the A. M. Byers Co. Doctor Aston stated that by the old hand puddling process, one man had to work approximately one and one-half hours to produce 300 lb. of metal, whereas now, by the use of specially designed machinery, the production of one heat has been increased to 6,000 lb. of metal with the use of very little hand labor. It is expected that the general use of this process will enable wrought iron to regain many markets which it has lost because of the physical impossibility of producing the metal in large quantities under the old hand puddling method. In speaking of the proper selection of pipe material, Doctor Aston stated that resistance to corrosion is the most important factor, and that the various competing materials must still be considered in the light of past experience rather than through the medium of accelerated tests, which have proved to be of little practical value. He also stated that wrought iron and steel, though totally different from a metallurgical point of view, are often confused in practice because of the similarity in appearance and in methods of pipe fabrication.

The successful laying of a difficult underwater pipe line between Portland, Maine, and Great Diamond Island was described by Harry U. Fuller, chief engineer of the Portland Water District. Cast-iron pipe in 12- and 8-in. sizes with ball and socket joints was jointed up on a curved timber chute 90 ft. long and then deposited in a dredged trench along the harbor bottom. The chute was supported by a timber framework resting directly on the harbor bottom. This was moved by a derrick lighter which lifted the heel slightly and dragged the main portion of the assembly along the trench. The chute itself was so proportioned that the maximum deflection at any one joint in the pipe could not exceed 10 deg. By means of this arrangement the contractor, the Bennett Contracting Corp., of Portland, was able to average 100 ft. a day with 12-in. pipe and 222 ft. with 8-in. The specifications allowed a maximum joint leakage of 4 gal. per 24 hours per lineal foot of pipe joint under 150 lb. of pressure. On the final test of one mile of 8-in. line, a pressure of 152 lb. per sq.in. was applied and left overnight. In the morning, after making proper corrections for temperature, the pressure gage still showed 105 lb. per sq.ft. pressure, indicating only negligible leakage. Cost on the line averaged $19 per linear foot for 12-in. and $10.30 per linear foot for 8-in. sizes, including the pipe. Much of the pipe used was obtained from an old line which had proved unsatisfactory, and which was salvaged at a cost of $1.72 per linear foot. New pipe, delivered on the job, cost $2.20 per linear foot.

Water Purification and Treatment

Three papers were presented treating of various phases of the purification of water supplies for the elimination of taste, color, odor and impurities. Some notes on the history of chlorination, with special reference to prechlorination, and on the use of ammonia with chlorine were given in a paper on "Development of Chlorination" by Francis D. West, manager of sales, Paradon Manufacturing Co. A study of the use of chloramine was advised. Where ammonia and chlorine are used together the rate of application of the chlorine may be less than it would be otherwise, but great care should be taken to see that the ammonia apparatus works properly since, if it does not, the rate of chlorine application will be too low for the chlorine alone. The importance of thorough mixing was urged. Mr. West made several references to ideas on chlorination advanced in Europe by Philippe Bunau-Varilla. In discussing the paper Linn H. Enslow said that the Bunau-Varilla theories as to the action of chlorine are not generally accepted.

"Modern Aspects of Color Removal," presented by A. S. Behrman, chemical director for the International Filter Co., was in the nature of a progress report on certain research experiments which have not yet been completed. An attempt is being made to determine hitherto unknown facts regarding the physical and chemical characteristics of color in water. Results obtained so far indicate that the coloring matter, as a rule, carries a negative charge of electricity, is of a colloidal nature, is chiefly organic in nature and is oxidizable. It has been determined that the color effect is often intensified by an increase in alkalinity, as measured by the pH content. Present methods of color removal are divided into four general classes: (1) Coagulation and filtration; (2) chlorination; (3) prechlorination and coagulation; and (4) activated carbon treatment. It is found that, in general, no one of these methods can be said to be predominantly successful, as each individual water must be considered as a separate problem. For example, chlorination, while effective in removing color from some waters, may fail entirely with others. This method also suffers from the disadvantage that dechlori-

nation is usually necessary to eliminate excess chlorine present after the color has been removed. The third method, a combination of pre-chlorination and coagulation, usually gives good results, as does the fourth, the use of activated carbon. However, the latter, while effective for color removal, is usually inadequate from the larger point of view. A combination of chlorine treatment with activated carbon reduces the frequency of renewal of the carbon and, in addition, gives adequate sterilization.

Treatment methods used in handling an unusually difficult water supply for the city of Rahway, N. J., were described in a paper by Mortimer M. Gibbons, waterworks chemist of that city. Water obtained from the Rahway River is treated by means of a complex process involving coagulation, mixing, detention, filtration through rapid sand filters, chlorination and aeration. This results in a satisfactory water from a sanitary point of view, but one which causes many complaints because of strong tastes, together with a moderate amount of color, odor and turbidity. Most of the trouble is attributed to industrial wastes which enter the stream from 40 factories within the watershed, which also contains a residential population averaging over 1,000 per square mile of watershed area. Among the chemical wastes discharged into the river are phenol, analine and chlorine. There are frequent periods when a strong woody or a medicinal taste, or both, are present in the output of the plant, this being particularly prevalent during the winter and spring when bacterial action in the stream is low. Despite much experimentation with different treatments, no complete remedy has been found. Among the treatments tried the author mentioned various degrees of chlorination, an ammonia and chlorine treatment, potassium permanganate, and activated carbon. The latter has proved the most satisfactory, eliminating the medicinal taste, but occasionally leaving the woody taste.

"Copper and Health," by William G. Schneider, of the Copper and Brass Research Association, was a discussion of the effect of copper on the human system. Mr. Schneider stated that no experimenter has ever been able to prove that copper in water supplies would have bad effect on health, unless it were present in such proportion as to render the water unpalatable. Small amounts of copper are said to be present in the human system, and almost universally in foods commonly used. It was stated that the presence of more than 6 p.p.m. of copper would create a distinctly unpleasant taste, whereas the presence of over 100 p.p.m. would be necessary to endanger health.

Superintendents' Session

A discussion on operating problems, scheduled to be held Friday morning, was transferred to the evening of Wednesday, Sept. 25. J. F. Maxcy, of the Calais Water & Power Co., Gardiner, Maine, presided. The first subject brought up for discussion was the lining of pipe with either bitumastic enamel or cement. The consensus of opinion was that such lining was worth while although, in the case of poured joints in bitumastic-lined pipes, it was felt that the lining is often damaged by the hot joint filler. Stephen H. Taylor, of New Bedford, Mass., stated that he had experienced several cases of damaged lining from this cause but that he understood that the trouble had been eliminated by the pipe manufacturers. Damage from Leadite, which is applied at approximately 200 deg. F. (as compared with the 1,200 deg. for lead), was held to be much less likely. An instance was cited of the use of cement-lined pipe which was removed after 37 years of service. It was found that although the cement had softened on the surface, so that it could be scratched with the finger nail, the main portion of the lining was unharmed and the pipe itself showed no signs whatsoever of corrosion. D. H. Maury, consulting engineer, stated that bitumastic enamel, when applied to the interior of sprinkling tanks with frequently changing water levels and great variations in temperature, showed satisfactory results after tests lasting several years, but occasionally required touching up at the water line.

Mr. Maury also requested the opinion of the gathering on the desirability of casting some kind of distinguishing mark on centrifugally cast pipe. The general opinion was in favor of such marking, but no one present could give a definite answer as to the possibility of providing marks with present practices of manufacture. Another point brought up at the meeting was the importance of insurance against airplane hazards in cases where pumping stations or standpipes were located near airports.

Great interest was aroused in the meeting by the introduction of a plea for more members, presented by the chairman. Mr. Maxcy expressed the opinion that there were many water-works officials in New England who were logical candidates for membership and who had not been urged to join the association. In rebuttal, Frank J. Gifford, secretary of the association, stated that every new official upon his appointment was sent a letter requesting him to join. Several superintendents then advanced the opinion that the programs at the various meetings needed more papers treating of the superintendent's own particular problems. However, no one present could suggest a method which would induce more superintendents to present such papers. Mr. Gifford suggested that a more intensive solicitation could be carried on by a permanent full-time secretary, and that a real need existed for the creation of such an office. Morris Sherrerd, chief engineer of the North Jersey Water Policy Commission, closed the discussion by advocating the attendance at the various meetings of water commissioners and other officials who, although not primarily technical men, need greater familiarity with the needs and problems of water works maintenance and extension.

Committee Reports

Work done by various committees of the association resulted in the presentation of a number of reports, of which the most important was that of the committee on painting standpipes, delivered by A. O. Doane, division engineer for the Metropolitan District Commission of Boston. This summarized considerable data which had been gathered on the subject of protective coatings for steel or wrought-iron standpipes. Of paint materials, red lead was favored as being the most satisfactory from all points of view, although the report also mentioned aluminum paint, zinc oxide, chromates of lead and zinc, and graphite as satisfactory. In general, it was stated that the paste form of pigment is better than the powder. Requirements for painting before erection or for pickling the steel were not favored. The committee believes that better results are obtained by a thorough cleaning after erection and immediate painting with three coats of an acceptable paint. Cleaning may be by the sand blast process, by power driven wire brushes or by hand scraping. This step is an exceedingly important one, as any failure to provide a proper surface for the paint will react unfavorably upon the life of the coating. Bitu-

minous coatings are also favored by the committee, with the warning that the cleaning process is even more important. Advantages of the bituminous coating include quicker drying and less likelihood of objectionable tastes in the water. In preparing the paint, it is essential to use the maximum possible proportion of pigment which can be spread in a thin even coat. This reduces the gloss on the surface after drying and gives subsequent coatings much better adhesion. On the last coat, however, a glossy finish is an advantage. The committee also recommends changing colors with each coat to facilitate inspection. Although the quantity of paint required is an exceedingly variable factor, the report states that on new steel, not pitted with rust, a gallon of red lead paint mixed with boiled oil can be expected to cover 700 sq.ft. of surface. Such a coating, applied after thorough cleaning, should have a life of from 7 to 10 years before repainting is necessary.

The committee on the disinfection of newly laid water mains reported through E. Sherman Chase, of Metcalf & Eddy, Boston, Mass., that it had sent out 200 questionnaires to members. Of 45 replies, 31 reported no disinfection. Of 14 that disinfect, 2 use chlorine, 7 use chloride of lime (hypochlorite), 4 use both of these agents and 1 uses "H.T.H.," a compound high in hypochlorite. Where no disinfection is used, precautions are taken against pollution of the pipe while open and the pipe lines are flushed out with water before being put in use. H. L. Newhall, engineer, Bureau of Water Supply, Akron, Ohio, reported that at Akron distribution of pipe along the trenches much ahead of the time for laying it was discontinued some years ago on account of experience with pollution. Stops are put in at the ends of the pipe to prevent access and pollution before the pipe is laid. Where the pipe is flooded or otherwise endangered before the trenches are backfilled, the pipe is disinfected.

Progress reports for several committees on cast-iron pipe and specials, working in conjunction with the American Standards Committee, were read.

Financial Statistics of City Governments for 1928

The U. S. Department of Commerce announces a summary of the financial transactions for the fiscal year 1928 of the 250 cities having a population of more than 30,000. The total payments for operation, maintenance, interest and outlays for permanent improvements for these cities were 79.8 per cent greater than similar payments of the governments of the 48 states and 0.8 per cent less than those for the federal government for the fiscal year 1928.

The payments for operation and maintenance of the general departments of the city governments of the 250 cities for the fiscal period 1928 amounted to $1,853,232,348, or $42.63 per capita. In 1927 the comparative per capita for operation and maintenance of general departments was $40.98 and in 1917 it was $19.07. Payments for the operation of public service enterprises, such as water-works, electric light plants and similar enterprises, amounted to $164,154,462; interest on debt, $342,100,311, and outlays for permanent improvements, including those for public service enterprises, $1,036,635,298. The total payments in 1928, therefore, were $3,396,122,419; in 1927, $3,324,386,351; and in 1917, $1,108,021,565.

Of the total municipal payments in 1928, 54.6 per cent was for operation and maintenance of general departments, 4.8 per cent for operation and maintenance of public utilities, 10.1 per cent for interest on debt and 30.5 per cent for outlays for permanent improvements.

Light Company Joins in Building City Water Pumping Station

AN UNUSUAL contract recently concluded between the city of Pittsburgh and the Duquesne Light Co. provides for participation of the latter in building a new pumping station at Brilliant. The city will erect the building and provide the piping, while the light company will install motors and pumps to the city's specification and will receive interest and amortization payments on this equipment in addition to payment for current used.

Brilliant station, the city's oldest and largest pumping station, is one of a group of three adjacent to the city's filter plant: Ross, which is the low-lift supply to the filters; Aspinwall, which draws from the filtered-water reservoir and supplies mainly the North Side (old city of Allegheny) but also feeds into the main city by a downtown cross-connection under the Allegheny River; and Brilliant, which pumps filtered water to Highland No. 1 and No. 2 reservoirs, from which most of old Pittsburgh is supplied either direct or through booster stations feeding local high-level districts.

The two Highland reservoirs are respectively 347 and 257 ft. above river level; as only the lower of them can receive emergency supply from Aspinwall station, continuity of service from Brilliant station is vital to the city. But the present station and equipment are old and in such bad shape that immediate safeguarding of the supply is considered necessary by the water bureau in the shape of a wholly new station, with (temporarily) a new pumping unit to be placed in the old station as stand-by.

A new steam station was estimated to cost about $1\frac{3}{4}$ millions, and electric station about half as much. The available balance of the last authorized bond issue for water improvements (1926) is insufficient to cover this cost, however. For this reason the special contract was entered into with the light company. Under it the city will spend about $700,000, the company about $125,000.

Six pumping units are to be installed, each a two-stage unit consisting of two independent pumps in series driven by synchronous motors on 2,300 volts. Four units will be built for the higher head and are to have 28,000,000 gal. per day capacity, the two others for the lower head, of 24,000,000, but spare impellers for one of the former will enable it to operate on the lower head. Two units on either head will carry the load, and the arrangement allows two spares for the high head and one for the low head. The specifications called for minimum efficiency of 81 per cent from electric energy to water, and in comparison of bids a valuation of $6,000 per 1 per cent of guaranteed efficiency on the three large units and $3,000 per 1 per cent on the three small ones is stipulated. The maximum guaranteed efficiency offered by any bidder was 86.6 per cent.

Under present published rates, as approved by the state public service commission, the station will buy electricity for about $6\frac{2}{3}$ mills per kilowatt-hour on the low-tension side of the transformers, this price including a maximum demand charge and an energy charge. At this rate the total annual cost will be slightly higher (about $25,000 per year, or about 10 per cent) than was calculated for a high-pressure steam station under efficient operation. The contract gives the city the right to purchase the motors and pumps at any time during the ten-year lease period; in case a new bond issue is voted soon this purchase will probably be made.

Prices of Structures Are Low

Contractors and Engineers Say and Prove That Lower Costs and Smaller Overhead and Profits Have Materially Reduced Prices of All Construction This Year

PRICES of general commodities have been falling for more than a year. Among these is the building materials group, which has dropped 9 per cent in price since Jan. 1. Have the prices of completed structures decreased similarly?

Henry C. Turner was one of the first to direct public attention to the present low prices of buildings. On June 18, 1930, he said, "In my judgment we have reached a low point in the cost of building, and the man with confidence in the future of this country will build now and at better prices than are likely to prevail again for some time to come." The opinions of other builders confirm this judgment. On July 1, S. L. MacMillan, general manager of the Aberthaw Co., said, "Building costs have declined nearly 3 per cent since Jan. 1 and are now at the lowest point in eight years." On Aug. 1, C. W. Mayers, chief engineer of Morton C. Tuttle Co., stated, "The drop in the cost of buildings which has taken place during the last three months has brought the building index (Tuttle's) down to a point which compares very favorably with the cost-of-living index." This building index was reduced 17 per cent in June, and has since continued at the low point of 163. Fig. 1 shows this index plotted with the cost-of-living index numbers of Massachusetts and of the National Industrial Conference Board.

Building has been hit rather hard this year. The slump in housing is actually a depression in a depression, as 1929 was a low year and 1930 is 48 per cent lower. The volume of other building types is also below those of other years, 16 per cent below that of 1929 for instance. In order to determine, therefore, whether or not buildings can really be had now at low prices, and if so, whether this situation extends to public works and private structures other than buildings, *Engineering News-Record* requested data on the question from a number of contractors and engineers engaged in both public and private construction. The response in opinion and facts not only confirms the thesis of Turner, Aberthaw and Tuttle, that buildings may be had at low prices, but proves that the same is true of structures other than buildings, including public works.

One reason for this is the severe slump in demand, which has sharpened competition until, as Mr. Mayers says, "The price of buildings has no definable relation to fair cost value." Another result has been to improve methods and management. Lower materials prices and higher labor efficiency are other factors. W. M. Caye, technical engineer of the commissioners of sewerage of Louisville, pertinently raises the question "What is cost?" He says it might be answered that "The cost is the money expended by the contractor in doing the work." This is, of course, the correct definition of cost as used in this inquiry.

C. H. Purcell, California state highway engineer, says: "Contractors on our type of work, in this state at least, are bidding very close figures. An analysis recently made indicates that on approximately $27,000,000 worth of work the bidders averaged more than 16 per cent below our estimates. We know of a number of contractors who sustained very serious losses, but the state does not encourage bidding at figures below those at which the work can be done. Our estimates are maintained on the basis of a fair profit, but are made with sufficient care to be sure that we are close to what the cost plus the profit should be."

Reputable contractors in New York are bidding below 1929 prices on jobs that are quite similar, and a Pittsburgh contracting company states that, "In our work this year we had to trim our figures very closely in order to be in the running. There is a lot of work being offered, but a number of contractors are without jobs, and in their efforts to land one have taken them practically at cost."

C. I. Dodd, of Black & Veatch, Kansas City, finds it true also for sewer construction, and "more especially in paving. Whether or not this is due to improved methods, contractors are bidding the work in at about what we figure actual cost to be."

In the Cleveland district, contractors are figuring closer to their actual costs than they have for a number of years. According to R. L. Harding of Wilbur Watson and Associates, building costs are 10 to 15 per cent below the average of the last few years.

Contractors bidding on public work this season have cut their prices materially below those prevailing to the end of 1929, according to Fuller & McClintock, New York City. The reduction is placed at 15 per cent, and is due to smaller overhead and profit, as well as to lower materials prices and labor costs.

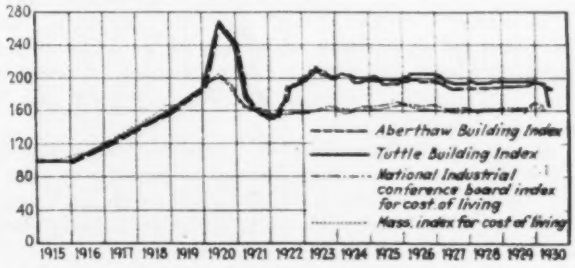


FIG. 1—TUTTLE AND ABERTHAW BUILDING INDEX NUMBERS AND THE COST OF LIVING

J. L. Bauer, state highway engineer of New Jersey, says that recent bids and those since Jan. 1 have apparently all been lower, and contractors are eager for work and will take jobs at as low as cost in order to keep their organizations busy. This situation applies "practically to everything which we carry out; grading, paving, foundations, viaducts, bridges."

That the situation prevails locally as well as for state work is indicated by the experience of R. C. Collins, county engineer of Union, who says of prices, "The 1930 level in Union County seems to be well below that of 1928 and 1929 for road and bridge construction, as evidenced by work awarded this year." He places the decrease at 8 per cent.

A. H. Pettigrew, senior assistant engineer of the Virginia department of highways, states that contractors are giving more time to supervision of the work and less to the office, and are cutting overhead. Competition is

greater this year among contractors and costs are lower.

R. H. Simpson, chief engineer of the city of Columbus, Ohio, "cannot remember the time in my 30 years of experience in construction work when bidding was as keen as during the present season." The city has under contract 1½ to 2 million dollars worth of sewer, paving, and masonry work, that has been let at 20 to 40 per cent below the engineer's estimate. Reinforced-concrete work on sewers and masonry walls has been bid at $11 per cubic yard against an estimate of $14 to $16.

"Our experience," says H. G. Sours, engineer of Summit County, Ohio, which includes the city of Akron, "is that we have better prices this year than at any other time. This is especially true on bridge work, with highways and drainage running a close second." He ascribes the conditions to a surplus of labor and to lower materials prices.

C. A. Melick, bridge engineer of the Michigan highway department, advises that the tendency toward close bidding is increasing. The result of the business depression, he says, has been to bring into the field of bridge construction many contractors engaged in other work. A number of large building contractors are now bidding "and bidding very close."

Mr. Mellick supports his statement with estimates of engineer and bidders on seven bridge jobs of April-December, 1929, and May-July, 1930. As Michigan does not make public its engineer's estimates, these can have no influence on the bid prices. Total figures for the fourteen jobs are given in Table I. The engineer's estimate of price, as distinguished from the cost estimate, includes contractor's superintendence at $300 per month, interest on bond at 6 per cent, and 20 per cent profit. Variation between the cost estimate and the bid prices in each of the two years averages 33 per cent above in 1929 and 26 above in 1930. The 1930 average bidding checks within a fraction of a per cent with the engineer's price estimate, compared with 6 per cent above in 1929. The average trend holds true also in the case of low bidders: whereas in 1929 his bid averaged 13 per cent below the engineer's estimated price, in 1930 it was 17 per cent below.

Another factual check-up is furnished by the data in Table II. Here are actual bids for a number of years, and these bids corrected for changing purchasing value on concrete road base and on vertical fiber brick in place at Akron, Ohio. On an absolute basis, this year's prices are 4 to 8 per cent lower than those of 1929.

The American Appraisal Co. building index numbers (Fig. 2) show the following total drops in percentages from year-ago costs: frame, 5; brick with wood frame, 2½; average of four types, 3½ per cent. *Engineering News-Record's* index of general construction costs dropped 3½ per cent in the last year. These figures re-

TABLE I—ENGINEER'S ESTIMATE OF COST AND PRICE AND CONTRACTORS BIDS ON SEVEN BRIDGE JOBS IN MICHIGAN IN 1929-30

	1929				1930			
	Engineer's Estimate		Bid Prices		Engineer's Estimate		Bid Prices	
	Cost	Price	Low	Average	Cost	Price	Low	Average
I	$17,787	$22,369	$19,953	$24,621	$30,537	$38,615	$35,550	$44,679
II	40,617	50,905	45,837	56,852	29,777	36,626	19,602	23,099
III	45,301	57,196	58,633	69,880	11,231	14,489	12,681	14,155
IV	26,496	33,320	35,830	40,000	16,511	20,743	15,690	18,545
V	34,684	42,662	24,705	30,451	13,705	17,561	15,359	17,033
VI	8,961	11,645	10,237	11,640	97,180	122,304	99,809	120,018
VII	18,283	23,317	15,420	23,320	61,834	78,643	74,348	92,439
Average	27,447	34,526	30,088	36,681	37,254	46,997	39,006	47,138
Low per cent+	+9	—13	.....	.....	+5	—17	.....	.....
Avg. per cent+	+33	+6	.....	.....	+26	0	.....	.....

BRIDGE JOBS IN 1929
Steel Deck-Girder Spans

	Month	Spans	Abutments	Piers	Roadway
I	December	2—50-ft.	21½- and 17½-ft.	1—22½-ft.	40-ft.
II	July	2—70-ft.	24½-ft.	1—24½-ft.	40-ft.
III	June	7—50-ft.	16- and 18½-ft.	None	36-ft.
IV	August	3—65-ft.	30 -ft.	2—34 -ft.	30-ft.
V	October	2—45-ft.	16½-ft.	1—22½-ft.	30-ft.
VI	December	1—50-ft.	14 -ft.	None	40-ft.
VII	April	1—60-ft.	14½-ft.	None	30-ft.

BRIDGE JOBS IN 1930

I	July	3—65-ft.	19 -ft.	23½-ft.	40-ft.
II	May	2—60-ft.	23 -ft.	1—31-ft.	30-ft.
III	July	1—60-ft.	13½-ft.	None	40-ft.
IV	June	2—40-ft.	24½- and 23½-ft.	24½-ft.	22-ft.
V	July	2—60-ft.	17 -ft.	15 -ft.	30-ft.
VI	July	2—50-ft. 6—75- f.	24½-ft.	31½ to 37-ft.	40-ft.
VII	June	2—45-ft. 4—75-ft.	18½- and 15½-ft.	5—25½ to 35½-ft.	30-ft.

TABLE II—UNIT BID PRICES ON TWO STANDARD PAVING OPERATIONS IN AKRON IN 1922-30

	Average of All Bids on Vertical Fiber Brick				Average Lowest Two Bids on 6-, 7-, 8-In. Concrete Base	
	3½-In.		3-In.			
	Actual	1913 Value*	Actual	1913 Value*	Actual	1913 Value*
November, 1920	....	....	$3.20	$1.25	$2.60	$1.02
July, 1922	....	....	....	....	1.54	0.91
September, 1922	....	....	....	....	1.63	.88
April, 1927	$2.15	$1.03	2.06	.99	1.60	.77
October, 1927	....	....	....	....	1.65	.81
March, 1929	....	....	1.93½	.93½	1.48	.71
August, 1929	2.03	.98½	1.94	.94	1.41	.68½
January, 1920	1.94	.93	1.96	.94	1.48	.71
May, 1930	1.88	.91½	1.87	.91	1.37	.67
August, 1930	1.86	.92½	1.80	.90	1.32	.66

*Actual divided by E. N.-R. Cost Index Number.

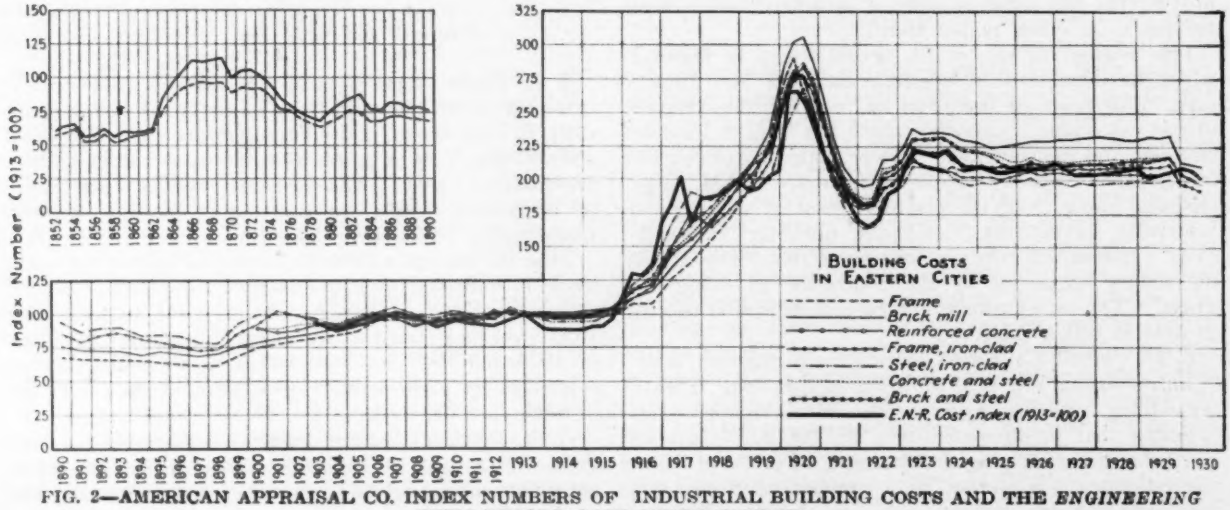


FIG. 2—AMERICAN APPRAISAL CO. INDEX NUMBERS OF INDUSTRIAL BUILDING COSTS AND THE *ENGINEERING NEWS-RECORD* COST INDEX NUMBER

cord the minimum fall in the price of structures. They do not take into account labor productiveness, improved methods and management, or profit sacrifice. It is interesting to note in this connection that the Aberthaw index which, according to Mr. MacMillan, "is brought up to date by making a new estimate which takes into consideration not only actual variations in cost of materials but also changes in labor rates, labor efficiency, and any other condition that might affect cost," dropped 3 per cent since the first of the year, compared with a 4½ per cent drop for the *News-Record* cost index. This is a substantial reduction in costs. Added to it are reductions made possible by the other factors discussed in the foregoing. The total reduction in price since the first of the year is probably at least 8 per cent.

Opinion, facts and figures, therefore, all agree that prices of all structures are now low as compared with prices in other years. The reduction is neither exact nor even, but varies with locality and with the project. It is partly psychological, caused by increased competition among contractors. Even that important factor, higher labor efficiency, though real, is neither uniform nor susceptible of exact measurement, as is the reduction in materials prices.

Road Design for Uniform Speed

Curve Superelevation and Other Design Features Predicated on Adopted Uniform Theoretical Speed

By W. R. Young
Tennessee Highway Department, Nashville, Tenn.

IT WOULD seem at this time that changes should be be adopted in planning roads. They should be planned on a mile-per-hour basis—that is, sections of highways, preferably between towns, should have all curves superelevated for the same theoretical speed. These sections should be posted at either end, and at other advantageous points, giving the speed for which they were planned.

In order that curvature may not be held to impracticable limits or the traveling speed be reduced, it would be advisable to raise the maximum superelevation to approximately 0.2 in. per foot. Such a maximum would be safe for loads with high centers of gravity. The small percentage of horsedrawn and extremely slow motor traffic could be taken care of by special stoned shoulders. This would tend to keep such traffic out of the traveled way, increasing the safety of the curve. The danger of sideslipping on icy pavements can be eliminated by

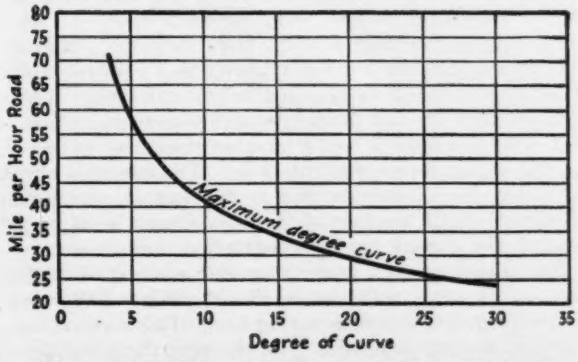


FIG. 1—MAXIMUM DEGREE OF CURVE, ASSUMING SUPERELEVATION OF 0.2 IN. PER FOOT

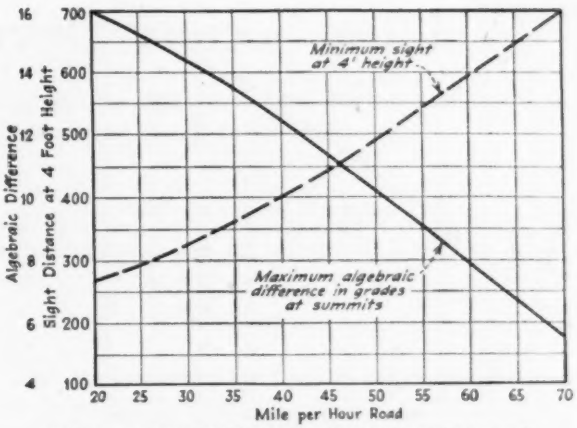


FIG. 2—SIGHT DISTANCE AND DIFFERENCE IN GRADES ON SUMMITS

roughing the pavements or by use of the stone shoulders. In more southern states this condition need not be considered.

The mile-per-hour road is a logical step in road planning. It would tend to relieve congestion, reduce accidents and make a smooth-riding road. It is due the traveling public that it should not have to try out a curve several times to find its maximum safe speed.

The planning of a mile-per-hour road should necessarily begin with the survey. Curvature should be limited to suit the speed desired and the maximum superelevation to be used. A 60-mile-per-hour road should be held

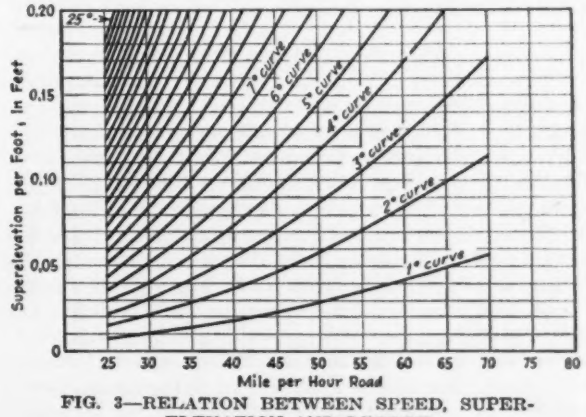


FIG. 3—RELATION BETWEEN SPEED, SUPERELEVATION AND DEGREE

as a minimum for trunk roads where grading costs permit. Too much superelevation is better than too little. A car traveling 40 miles per hour will ride easier on a curve superelevated for 60 miles per hour than on a curve superelevated for 20 or even 30 miles per hour.

The survey should take into account the sight distance necessary on a high-speed road. Steep grades call for excessive vertical curves.

In order to provide for horsedrawn traffic and slow motor traffic on curves where a high per cent of bank is required, 6-ft. stoned shoulders should be used. Their superelevation should run about half the superelevation of the adjacent pavement. On a curve where extremely wide pavement is necessary, the pavement should be divided and each half superelevated individually on the same grade. Superelevation should be pivoted on the center line, and steep grades on curves avoided.

The charts shown will give an idea of the relative requirements of different speed roads.

Welding Society Discusses Tests and Practice

Physical, Electrical and Ray Tests—Progress Report on Structural Welds Tested to Destruction —Welding of Truss Joists, Rails and Rail Joints—Economic Aspects

Engineering News-Record Staff Report

MODERN developments in welding processes and equipment, in commercial and laboratory work and a wide variety of practical applications were presented in review at the fall meeting of the American Welding Society, held in Chicago Sept. 22 to 26 and forming a constituent part of the National Metal Congress, composed of several societies holding simultaneous meetings, as noted in the news columns of this issue.

Tests of Structural Joints—At a meeting of the structural steel welding committee, presided over by Leon S. Moisseiff, recently selected as chairman in place of the late James H. Edwards, a report was made by H. M. Priest on the progress in the committee's investigation of the ultimate strength of welded structural joints made in fabricating shops. The original plans included the testing of 1,677 specimens of joints. Of that number 1,008 have been completely tested and work is now being done on 216, with about 450 specimens yet to be received. The object of this investigation is to determine the degree of reliability of structural joints made in reputable fabricating shops by qualified welders, rather than to determine the type of welding material or methods to give highest strength.

Laboratory Studies and Tests

Physical Tests—With the extensive use of welds in structures subject to dynamic stresses, dynamic tests for welds are highly important and were discussed in a paper on "Fatigue and Impact Tests for Welds" by Charles H. Jennings (Westinghouse Electric & Manufacturing Co.), describing an extensive study and laboratory investigation. As a tentative standard for test specimens he proposed a form of cantilever specimen for fatigue tests of endurance limits in butt and fillet welds. For ordinary purposes, the test piece has a critical diameter of 0.468 in., but for large welds a diameter of 2¼ in. is desirable. Although important, impact tests have not been made extensively and present information is not sufficient to warrant any recommendation for standardizing them.

Further studies on the endurance limit of welded joints when subjected to reversals of stress were described in a paper on "Fatigue Investigations of Welded Joints," presented by Professor G. E. Thornton, State College of Washington. Specimens machined to a diameter of 0.40 in. and tested as rotating beams gave evidence of the fact that the best welded joints made at present have a lower endurance limit than that of the parent metal. The most important reason cited for the lower strength of the welded material is the non-homogeneous structure due to oxide spots and pits caused by gas inclusions. Differences in grain structure and in hardness between the weld metal and the metal in the original bar are also contributing causes. Internal stresses as high as 25,000 to 35,000 lb. per square inch have been determined in the bar, due to the heat of welding. Discussion brought out the fact that welds made with bare electrodes are often brittle and of lower strength in fatigue than those made with coated electrodes.

Standardization of methods employed in testing welds was the subject of a symposium presented by the members of a committee of the American Bureau of Welding. Considerable study has been given by members of the committee to the best shape of specimen to be used for a tension test as well as the procedure to be recommended in making a bend test for the determination of ductility. Considerable discussion which followed the presentation of the tentative recommendations is expected to be of value to the committee in its preparation of final specifications.

Stress distribution along a side-weld joint, or one in which the weld is parallel to the direction of stress, is known to lack uniformity. Three new features in connection with such joints, as presented by W. H. Weiskopf and Milton Male (U. S. Steel Corp.), include: (1) a theory of the manner in which side welds deform under shearing loads; (2) determination of the effective area of the joint, or the percentage of total area considered as transmitting load; (3) determination of the length of welds so that the maximum shear stress will not exceed the average design stress by more than a given desired ratio.

Ray and Magnetic Tests—That examination of welds by the X-ray diffraction method, now under investigation by the American Bureau of Welding, gives fundamental information of value in supplementing metallographic processes, was claimed in a paper by Professor John T. Norton (Massachusetts Institute of Technology). While extensive use has been made of X-rays by the radiographic method, the diffraction method has been neglected. But it yields two important classes of information: (1) the arrangement or grouping of the atoms to form the solid state, and (2) the granular structure or the size and orientation of the crystal grains. Upon this structure depend very largely the physical properties important in welding, such as strength, ductility and resistance to deformation.

The use of gamma rays emanating from radium as a means of examining heavy welds and castings for internal defects was suggested in a joint paper by R. F. Mehl, G. Doan and C. S. Barrett. Instead of the elaborate apparatus necessary for X-ray examinations, all that is necessary is a capsule about the size of a 22-caliber cartridge, which could be used easily in complicated steel framing or even under water. This capsule is supported in front of the weld and a photographic film in an envelope is fastened behind the weld. These gamma rays are of much greater power than X-rays and will penetrate a much greater thickness of metal, say 12 in., as compared with 3 in. The capsules might be rented from hospitals, and as the rays are emitted in all directions, a number of specimens may be arranged around the capsule and photographed simultaneously.

New developments in the magnetic method of testing butt welds were reviewed by T. R. Watts (Westinghouse Electric & Manufacturing Co.) This method consists of passing magnetic flux through the weld from below and placing iron powder or filings on a piece of photographic paper laid upon the weld. Defects such

as cracks, blowholes or poor fusion are indicated by the dense collection of the iron particles over these parts. More exact results are obtained by a modified method in which the magnetic-potential drop is measured across the weld and for the same distance in the solid metal. The conclusions were that this latter method is more quantitative and more nearly free from personal judgment; also that it is as practicable and reliable as any other non-destructive test method, although precise predictions of strength are not to be expected. On the other hand, magnetic testing for other than butt joints does not promise much success.

Welding in Railway Work

Repairing Worn Rails—Extensive use of welding to build up the battered ends of rails, as practiced on the Southern Pacific Railway, was described in a paper by W. H. Kirkbride, engineer of maintenance-of-way and structures, the paper being read in his absence. This substitute for cropping the ends of worn rails was begun in 1913, using the oxy-acetylene system, which is now restricted to yards and scattered jobs. Since 1925 the electric-arc system has been used and somewhat crude welds then made enabled the 90-lb. rails to remain in track until April, 1930. In recent years, the apparatus and methods have been greatly improved, and the work is handled by a special organization. The total number of joints built up is 669,511 by the oxy-acetylene process and 541,369 by the electric-arc process, at average costs of $1.21 and 66c. respectively. So manifest are the results that authority has been given to purchase additional equipment which will enable battering to be corrected before it becomes objectionable.

Welding is not done usually until the depth of wear or batter is $\frac{3}{4}$ in. at $\frac{1}{2}$ in. from the end of the rail. A special welding machine was designed by the Southern Pacific engineers and thirteen of these have been built. Rails properly welded by the electric-arc process, and with the use of weld rods of 0.9 to 1.10 per cent carbon, do not batter as rapidly as the original rail, owing to the high carbon content of the new metal. The practice of the Canadian Pacific Railway in building up worn rails by welding was described in *Engineering News-Record*, May 2, 1929, p. 719.

Welding Rail Joints—While Mr. Kirkbride dealt with the improvement of rail joints by welding, the elimination of joints by butt-welding the rails was suggested by L. C. Ryan (Oxweld Railway Service Co.), who instanced the welding of rails into long lengths at road crossings, in tunnels and through stations. He stated that experience with rolled rails up to 66-ft. length, both here and abroad, had shown the expansion difficulty to be very slight, and that in any length of rail the expansion and contraction takes place in about 40 ft. of the end of the rail. The lengths of continuous rails formed by welding were not mentioned, beyond a statement that in Germany stretches of about 1,000 ft. have been satisfactory. The welding can be done in track without interference to traffic.

The elimination of rail joints was dealt with also by J. H. Deppeler (Metal & Thermit Corp.), who referred particularly to a joint made with a fusion weld in the base and web and a pressure weld in the head. He remarked that while calculations show temperature variations will not cause trouble in long rails, engineers are slow to make trials, although these calculated results are supported by experience with 66-ft. rolled rails. To prevent possible weaving of long continuous rails he suggested the use of double-shoulder tie plates, as used extensively in Europe but only to a limited extent in this country. A reference to the somewhat elaborate treatment required for welding this joint by two processes was made during the brief discussion.

Possibilities in further development of fusion welding in railway work, due to careful study, supervision and record of results and costs, were noted in a brief paper by G. W. Lieber, superintendent of reclamation of the Missouri-Kansas-Texas Lines. However, his paper was of a general character and did not refer to specific methods or uses, but indicated the application of welding to structures, track and rolling equipment.

Economics and Practical Applications

Economics of Welding—The ultimate economic value of welded products is highly indefinite under present systems of estimates and accounting, according to a paper on the cost of welding by Robert E. Kinkead, consulting engineer, Cleveland, Ohio. In some cases, welded vessels have failed and been repaired frequently in service, while other similar vessels have continued in service without failure. Tests made by Professor Moore (University of Illinois) have shown that pressure vessels welded in one way may have a life of 5,000 cycles, while with similar vessels welded in some other way the life is raised to 400,000 cycles. It is obvious that a purchaser would be willing to pay considerably more for the products of the latter system, with their longer life and the freedom from interruption and costs due to repairs. The same applies to welded buildings, industrial equipment and other work. What is needed, he urged, is a cost indicator based upon the life or economic value of the product.

Applications of Welding—Resistance welding for use in large shops or plants where ample current supply is available was advocated by Frank Burton, consulting engineer, Detroit, who described particularly the production of truss joists by welding web members to the chords. Two types of construction were noted, the V-shaped web members being either butt-welded to the stems of T-shaped chord bars or welded between pairs of angles for the chords. Resistance welding as used in this way has been regarded with some suspicion, according to the author, who stated, however, that such welding with proper machines is reliable and of uniform strength. For resistance welding, the plain butt weld is ideal, the bars, gripped in copper electrodes near the ends, being pressed together. With the T-section chords, the web members are forced against the stem by a copper electrode shaped to fit the curve of the V-shaped web member, the apex of which flattens at the point of contact. Analyses of the weld metal show that it undergoes no chemical change.

Of special importance in aviation development was a long report on the strength of welded joints in tubular members for aircraft, with recommendation of methods for reinforcing the joints by straps. Equal strength can be given by welding large gussets between the intersecting tubes, but the weight and time involved are excessive, the weight being about 0.56 lb., as compared with 0.16 lb. for weld metal and strap. This report, by H. L. Whittemore and W. C. Brueggeman, of the U. S. Bureau of Standards, dealt with an investigation made by the bureau in co-operation with the National Advisory Committee for Aeronautics (U. S. Department of Commerce) to develop information as to the strength, weight and cost of different types of welded joints.

Letters to the Editor

A Forum for Discussion of Views of Engineers and Contractors

Force-Account Levee Construction

Sir—In your Sept. 18th issue you have an article by Walter F. Lineberger, "Force-Account Levee Construction." May I ask why all this perturbation in regard to the government doing its own construction in order to save the taxpayers money? That is just what they are doing. Having had some levee experience, I know that in nearly every instance the government machines do work more cheaply than the contractors' bid. Equipped with efficient and trained organizations, the machines turn out estimates as large as the contractors' organizations with like units. This not only saves the contractors' profits but keeps the contractor from bidding on work at exorbitant prices, which would be the result if a law was passed to keep the government from doing any of its own construction.

Mr. Lineberger states there is no good reason why this work should not be done by contract, except that the government has established a personnel both in the office of the Mississippi River Commission and in the field whose jobs depend upon continuous operation of the government plant and who feel, perhaps unwittingly, that every contract awarded is a threat against their security. Just what does the general public owe the contractors on the Mississippi? No more than it owes the organization the government has built up in order to give the public levees at a lower cost. Ever since I can remember the contractors on the Mississippi have been clamoring for some kind of special favors. Just why does the government owe them any more than it owes any other ordinary citizen? If they can do the work more cheaply than the government, they should bid to that effect. I am sure it wouldn't be long before they would have all the work they want at a fair price, and no special law would be required in their favor.

It seems to me what should be done is to make detailed plans for each project giving all the information necessary for the contractor to make an intelligent bid. On projects where his bid is as cheap as or cheaper than the engineers estimate they can do the work, he should be given the work. From a standpoint of public welfare there can be nothing unethical in this procedure. But I see no reason why the contractor should be shown any special favors by law or otherwise over the organization that has been built up by the engineers for this construction.

Maysville, Ky., Sept. 22, 1930. E. H. Harvey, Mason County Road Engineer.

No Badge Needed

Sir—Traveler's letter, printed in your issue of Sept. 18 under the caption "Why the Pin," puts into good, clear English a thought which has been germinating in my mind for a long time. There is more than one angle to this situation, however, although the inferiority complex is at the bottom of the whole business.

Exceptional people need no badges or certificates of ability or character. As a rule they simply exude the unmistakable evidences of their superiority. These need no society emblems except possibly as stepping stones when first starting on their careers. With the common or garden variety of professional or business man regardless of vocation, the problem of gaining recognition is more difficult. Acceptance into the fold in which these leaders are the moving spirits gives one a feeling of perfectly justifiable pride and a natural and legitimate desire to advertise the fact by all lawful and ethical means. The constant wearing of the society pin is the result.

Engineering society growth is largely the result of this same inferiority complex and the resultant desire to wear the coveted pin or emblem of superiority. Were it not for this psychological trait, I doubt if our societies would number anything like half their present membership. Abolish the pin, and without doubt there would be little or no further need for grades recognizing superqualifications—simple membership would be sufficient, as in the past. It is quite possible that the character, influence and true usefulness of our engineering societies would be enhanced by the purging of their membership which would undoubtedly follow such a step.

People of consequence are more and more inclined to consider it not only bad taste but also find it more and more to their advantage not to display conspicuous evidences of their connection with particular organizations, whether social, fraternal or religious, because of the possibility of arousing antagonism among dissenters therewith. It seems, therefore, that there is good ground for the thought that the society pin, like the convention badge, might better be dispensed with, except possibly while attending gatherings of the particular organization. The engineer would do better to just "be like folks" and let the world find out that he is an engineer as best it can. At the same time he should be both proud of and loyal to his profession, and ever an upholder rather than an apologist for it. Upstater.

Utica, N. Y., Sept. 19, 1930.

Does the Pin Certify Competence?

Sir—In your issue of Sept. 18 a correspondent who signs himself "Traveler" makes some observations on the wearing of pins by members of the American Society of Civil Engineers, comparing engineers with other professional men.

The engineer cannot be compared with medical men and members of the legal profession in the manner that Traveler compares them.

Architects do not wear buttons showing that they are members of the A.I.A. or any other society, but the public comes into contact oftener with architects and understands what work they do better than they understand the work of civil engineers. The Institution of Civil Engineers in Great Britain did not have a button for its members, but when it discovered that a very large number of competent civil engineers were not connected with the Institution managed to have a law passed by parliament providing for the existence of Chartered Civil Engineers. Now if one wishes to practice civil engineering in Great Britain it is necessary to pass examinations or join the Institution of Civil Engineers as an associate member or member. Thereafter one has the right to place after his name the magic words Chartered Civil Engineer.

Membership in the American Society of Civil Engineers is something to be prized. Until we have an adequate determination of engineering ability through state examinations and licensing nothing can replace the fact of membership in a society that examines the records of all applicants very carefully. The pin I have found is of value, for it settles one point that interests many prospective employers. I became a member of the American Society of Civil Engineers, after holding opinions very similar to those expressed by Traveler, only when several clients expressed surprise that I was not connected with the society. In my experience I have discovered that membership in the society is a distinct asset and I finally took to wearing the pin. It serves as an introduction.

Traveler appears to believe that some employers would employ, out of three applicants of apparently equal ability, two of whom wore the Am.Soc.C.E. pin, the one who did not wear it. That may be true of employers who are reluctant to pay decent salaries and have an idea that men who wear the pin may want higher pay than men who do not belong to the society. I also have found a few employers who hold an idea that the society is in some sense a trade union and may be found troublesome in the event that members may be treated unfairly by employers.

I know one corporation that selected an engineer when he showed them that he was listed in "Who's Who in Engineering." Employers must have something to guide them and membership in a national engineering society must serve until the state issues a guarantee. Until then we must keep our pins shined. M.Am.Soc.C.E.

New York City, Sept. 22, 1930.

News of the Week

Contract Awarded for $1,000,000 Bridge at Knoxville, Tenn.

The contract for the Henry St. bridge at Knoxville, Tenn., has been awarded to Booth & Flinn, of Pittsburgh, for $911,000. The bridge will be of reinforced concrete and will be more than 1,000 ft. long, with 54 ft. between curbs. Plans for the bridge, upon which work will start immediately, were drawn by the Marsh Engineering Co., of Des Moines, Iowa.

Bids Opened for Construction of Prettyboy Dam

Bids for the construction of the Prettyboy dam, which will double Baltimore's reservoir water supply, were opened on Sept. 25. There were 24 bidders and there was a difference of almost a million dollars between the highest and the lowest bids. The low bid was submitted by the J. A. Laporte Corporation, of Albany, N. Y., whose bid was $996,732. The city engineer's estimate was $1,250,000.

Pennsylvania R.R. Opens New Terminal at Philadelphia

The first units of the reconstructed passenger terminal facilities of the Pennsylvania Railroad at Philadelphia was put into service with the change in time on Sept. 28. They include a new suburban station below street level in the block directly north of the station tracks of the old Broad St. station, new underground and overhead tracks from the suburban station out across the Schuylkill River to West Philadelphia, and the suburban section of the large passenger terminal to be built there. Temporary track connections will permit the operation of some through trains to and from the Broad St. station over the new tracks of the suburban station while the main passenger terminal from West Philadelphia is being built. Only electric trains will operate into the new underground suburban station, there being 325 normal daily train movements to be provided for.

Stuart Named for President by A.S.C.E.

Board of Direction Awards Prizes, Disciplines Two Colleges and Urges Earthquake Research—Engineering Council Representatives Named

NOMINATION of Francis Lee Stuart as the official candidate for president, discontinuance of recognition of two state schools in Mississippi, and an urgent plea that the government provide funds for increase of seismographic work by the United States Coast and Geodetic Survey were the principal results of the work of the board of direction, American Society of Civil Engineers, at its session this week prior to the St. Louis meeting of the society on Oct. 1 to 4.

John P. Hogan and C. E. Smith were elected representatives on the assembly of American Engineering Council, in addition to H. S. Crocker, C. E. Grunsky, A. J. Hammond, J. C. Hoyt, A. Marston and F. L. Stuart, whose terms expire Jan. 1, 1931.

The board adopted a report on charges and methods of making charges for professional services, being an 11-p. epitome for the use of clients. Looking toward participation in a joint program of engineering with other societies during the Chicago World's Fair, A. J. Hammond, C. F. Loweth and A. F. Reichmann were appointed to co-operate.

Prizes for 1930 were awarded to Charles Terzaghi, Norman medal; H. DeB. Parsons, Croes medal; R. McC. Beanfield, Rowland prize; John H. Gregory, C. B. Hoover and J. N. H. Cornell, Laurie prize; and George Gibbs, Wellington prize. No award was recommended for the Collingwood prize.

Two Colleges Disciplined

The reason for disciplining or breaking relations with the Mississippi schools arose from the action of the Governor in dismissing more than 100 professors, including presidents, deans and several engineering faculty members. The board held that present conditions are not such as to make possible suitable instruction in engineering and therefore voted that the University of Mississippi and the Mississippi Agricultural and Mechanical College be no longer considered schools for recognized

SUBURBAN SECTION OF THE NEW WEST PHILADELPHIA STATION

In the completed project the main line tracks will be at the lower level shown here. Above is the Arch St. viaduct at concourse level of the main station with taxicab stands and bus terminal. On the third level at right angles to the tracks on the lower level are the platform tracks of the suburban station (steel train sheds under construction at the right). At the extreme left is the viaduct to carry the suburban tracks across the projected River Drive to connect with the new Schuylkill River bridge.

reputation. Further affiliation of the student chapters was discontinued. The American Bar Association and the American Medical Association have taken similar action, the latter's action resulting in reinstatement of the medical professors.

The appeal for a seismographic appropriation carries out recommendations looking toward collection of earthquake data on periods, amplitude and acceleration in order that engineers may design and build better earthquake-resistant structures.

N. Y. Highway Contractors Must Give Citizens Preference

Governor Roosevelt, of New York, has written to Frederick Stuart Greene, state superintendent of public works, calling his attention to the law which requires contractors on state projects to give preference to citizens of New York State in taking on employees. The Governor says he has received complaints, especially against highway contractors. He asks that each division engineer be required to check up and report on the situation in his district.

N. Y. State License Board Sets Up Educational Requirements

Educational requirements which applicants for licenses in the State of New York must have before their applications will be approved by the state board of licensing for professional engineers and land surveyors were established by the board in a set of bylaws adopted on Sept. 27. The new requirements are given in two sets of examinations to be passed by applicants who are not graduates of engineering schools approved by the state educational department.

Objections have been raised to the New York State engineer license law on the ground that it does not set up adequate preliminary and professional education requirements. The law gives wide discretionary powers to the board and as the board has never heretofore gone on record as to what it would accept as being "of a character satisfactory to the board," frequent claims have been made that a man having little preliminary education in the fundamentals of engineering could obtain a license after six years of active work in engineering regardless of its character.

A four-day written examination has been laid down. Examinations in mathematics through calculus, applied sciences, graphics, materials of construction, structural design, mechanical design, electrical design and administration extending over a period of three days are required of all applicants subject to the examination. The second part covers the fourth day. It gives the applicant an option of one of five examinations in either civil, mechanical, electrical, mining or chemical engineering, depending upon which branch he has specialized in.

Port Engineers and Officials in Annual Meeting in Milwaukee

Harbor Engineering and Port Administration Among the Subjects Discussed

HARBOR engineering and port administration were covered in the proceedings of the nineteenth annual convention of the American Association of Port Authorities, held at Milwaukee, Wis., on Sept. 23 to 26, with Major-Gen. W. L. Sibert, U. S. A. (retired), presiding. The entertainment features included a lunch and trip around the harbor on one of the new turbo-electric car-ferry steamers of the Pere Marquette R.R.

Deepening of the channels in the Great Lakes to 25 to 27 ft. to provide for vessels of 24-ft. draft, as authorized by Congress at an expense of nearly $30,000,000, was reviewed by Col. E. M. Markham, Corps of Engineers, U. S. Army, who explained that the War Department is also charged with a study of improvements necessary at the principal ports to bring them into accord with this increased channel depth. At present there are about 75 miles of connecting channels having a depth of 21 to 24 ft. and a width of 300 to 1,000 ft., providing for vessels of 20-ft. draft. The largest ore boats now carrying 15,000 tons will be able to carry 19,000 tons at the 24-ft. draft.

Equipment for Wharves

Wharves 32 ft. wide with two tracks, one serving as a running track, were recommended by George F. Nicholson (Los Angeles, Calif.). Where only a small proportion of cargo is handled directly between ship and cars a 20-ft. wharf with one track may suffice, but this width is a minimum even with no track, as it is necessary for the handling of tractors and trailers. Large cargo-handling cranes are considered unnecessary, as the use of ship's hoists is far more economical. However, light and portable freight-handling equipment was recommended for wharf sheds, locomotive cranes for special work and floating cranes for very heavy traffic.

A new river terminal with elevator connections at Cincinnati was described by A. C. Stutson, chief engineer of the Mississippi Valley Barge Line Co. A brief verbal report on threatened suits against certain ports for alleged infringement of patents for reinforced-concrete wharf construction was presented by Carroll R. Thompson (Philadelphia). Unification of the present widely differing methods of port control was recommended by Lieut.-Commander Melville W. Powers, U. S. Navy. That there is a growing tendency toward municipal participation in the dock and industrial equipment of lake ports was noted by W. G. Bruce, chairman of the Milwaukee harbor commission, although these developments have so far been made mainly by individual and corporate initiative. A paper advocating free ports such as are established in Europe, where imports can be manufactured into exports without paying duty, was presented by Billings Wilson (New York) and was received with much approval.

Riparian Rights Discussed

Riparian rights, as affecting the design of ports and terminals, were discussed by Victor Gelineau (New Jersey board of commerce and navigation). He pointed out that although the federal government has power to control navigation and to establish pierhead lines, it has no riparian control, as all land under water is vested entirely in the state governments. The work of the U. S. Shipping Board in regard to ports and harbors, including its studies and reports on various individual ports, was reviewed by T. V. O'Connor, chairman of the board.

For 1930-31 Martin W. Oettershagen, city harbor engineer of Chicago, was elected president. Tiley S. McChesney, assistant general manager of the New Orleans port commission, was re-elected secretary.

Wide World Photo

MODERN TENEMENT COLONY IN GERMANY

This unique arrangement of tenements is being experimented with in Leipzig, Germany. It is known as the "Round City" because of the fact that the buildings constituting it are laid out in a circle.

New Jersey Cities Acquire Water Company for $13,000,000

At the direction of Judge William B. Mackay in the circuit court in Paterson, N. J., a struck jury on Sept. 24 gave a verdict for $13,000,000 to be paid by the Passaic Valley Water Supply Commission to the Passaic Consolidated Water Co. for its holdings. The commission represents Paterson, Passaic and Clifton. By the verdict a long contest is ended. A condemnation commission had rendered an award of $14,000,000 and both sides had stated they would appeal, but a compromise was effected at $13,000,000, and the struck jury was impaneled as a formality to give effect to the compromise.

Gen. MacArthur the First Engineer to Be Chief of Staff

For the first time since the creation of the General Staff of the army in 1903 the head of that important military unit, holding the full rank of general, will be an engineer, Douglas MacArthur. General MacArthur's tour of duty begins in October on his return from the Far East, where he has been in command of the Philippine department. Heretofore the chief of the General Staff has been chosen from infantry, cavalry or artillery. The one exception was Gen. Leonard Wood, who was an officer of the medical corps.

During the war General MacArthur won a reputation as a fighting soldier and an administrator of high ability. He was twice wounded in action. Shortly after the outbreak of the war he was transferred to the line of the army. As Chief of Staff and later as commander of an infantry brigade in the Rainbow Division he made an exceptional showing. After the war he served with the army of occupation. He was superintendent of the U. S. Military Academy from 1919 to 1922.

Higher Standard of Engineering Urged by N. Y. State Society

Professional Engineers Meet and Discuss Ethics and Higher Standards for Registration

MEANS of improving the professional standing of engineers and of bettering conditions within the profession were the subjects of discussion at the annual convention of the New York State Society of Professional Engineers held at Rochester, N. Y., Sept. 23-24. This was the first time that the society, now having a membership of 1,458, had attempted to hold a convention outside of the New York metropolitan district. The attendance was fair, but not up to expectation.

The need for higher ethical standards was stressed by D. B. Steinman in his presidential address; later the willingness of the society to support his views was expressed in the adoption of a skeleton code of ethics about which the individual chapters may build codes designed to suit their local needs.

Raising of Standards Indorsed

Hearty indorsement was given to the work of Dr. Steinman, who as a member of the Board of Engineering Examiners, has prepared an outline of the subjects in which applicants for licenses must be proficient. A resolution was adopted urging the Board of Examiners to incorporate in its bylaws Dr. Steinman's proposal for written examination for applicants not graduates of approved engineering schools. It was pointed out by Arthur Sheridan, past-president of the society, that the lack of such definite requirement in the examining board's bylaws has been used effectively by the architectural profession in attacking the competency of licensed engineers in New York State. The bylaws as proposed by Dr. Steinman would require a four-day written examination, three days for fundamentals common to all and the fourth day devoted to specialized subjects in the civil, mechanical, electrical or mining fields.

Efforts to raise the standard for obtaining a license to practice professional engineering in New York State were indorsed by the representatives of the engineering schools who were present at the convention.

Proposed legislation to amend the license law was discussed by Arnold G. Chapman, chief engineer of the Albany Board District Commission and chairman of the legislative committee. Changes in the administrative section of the law and in the educational requirements which were included in a bill which failed to pass last year are to be submitted again this year, but each change will be introduced as a separate bill in order to insure passage of those provisions which are unopposed. Enforcement, a saving clause for architects and the use of seals also are to be considered.

The uniform registration law adopted by the joint committee of the founder societies was indorsed in principle with certain recommendations as to changes in detail.

There was considerable discussion of the proposal to require both engineers and architects engaged in the design of structures involving public safety to obtain from their licensing board special certificates of competency in structural design, but no action was taken on the matter, as none was deemed necessary until a willingness to take such a further step in licensing was expressed by the architectural profession.

Society's Name Shortened

A resolution calling for the change of the name of the society from the New York State Society of Professional Engineers and Land Surveyors to the New York State Society of Professional Engineers was adopted without prejudice to the land surveyors. The present name of the society has been found much too long for convenient use.

The subject of the publication of a monthly paper or journal was discussed, but no action was taken, as the matter is still pending with the executive committee. The proposed arrangement is to have the publication of the paper handled by a firm in New York which will solicit the advertising and do the printing and mailing of the publication under the supervision of the officers of the society.

NEW C. & O. BRIDGES, CINCINNATI UNION TERMINAL DEVELOPMENT

View of Chesapeake & Ohio Railroad connections entering new Cincinnati Union Terminal development. Steelwork is on a new freight line; the passenger line will enter the new station over piers shown at the left.

New Railroad Station Planned at Hamilton, Ont.

The Toronto, Hamilton & Buffalo Railway announces plans to erect a new ten-story station at Hamilton, Ont. The project includes the elevation of the tracks from the Hunter St. tunnel to the east of Wentworth St. and will entail the expenditure of $1,125,000 for labor alone. The plans have been laid before the city officials and as soon as their approval has been given, work will be commenced.

Difficulties in Aswan Dam Work Result in Suicide of Engineer

Sir John Norton-Griffiths, an eminent British engineer and managing director of Norton-Griffiths & Co., contractors on the work of raising the crest of Aswan dam in Egypt, committed suicide at Alexandria, Egypt, on Sept. 27. Norton-Griffiths & Co. some months ago entered into a contract with the Egyptian government to enlarge and raise the crest of Aswan dam along the lines recommended to the government by a commission of engineers in December, 1928. Details of the proposed work were published in *Engineering News-Record*, Feb. 14, 1929, p. 278. The bid of Norton-Griffiths & Co. was $9,800,000, the lowest of eleven bids. The next highest was $12,060,000.

On Sept. 20 Sir John had addressed a letter to the Egyptian ministry of public works, stating that work on the dam was being suspended because of the unreasonable demands of the Egyptian inspectors, who he claimed were inexperienced and incompetent. Subsequently it developed that he had reported to the government that payments for the work were far behind expectations and asked for financial assistance.

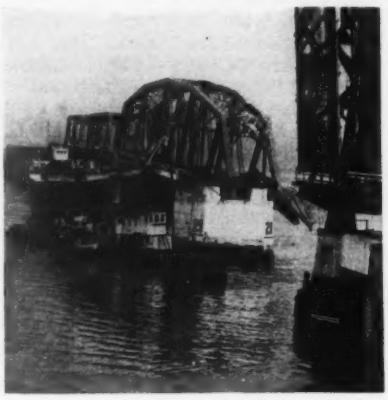
St. Lawrence Power Commission Given Full Range in Studies

Wide latitude was given to the commissioners set up by the New York State legislature last January to study and report upon the development of the state's share of power in the St. Lawrence River. The only limitations set upon them in their studies was that they should first undertake to devise a practical plan of development of the power through a state agency. Failing to find such a plan practicable, the commissioners may determine whether other plans would be more beneficial to the people of the state, and may recommend such plan or plans.

The commission is required to confer with federal and Canadian government authorities as well as with representatives of the power companies on the St. Lawrence. Its report shall show sites available, estimated cost of construction and operation, methods of financing, and the steps necessary to accomplish development. Tentative forms of contract for sale of power also are to be submitted.

Should the legislature approve the plan submitted, the law provides that if development by a state agency is recommended that agency shall be a "corporate municipal instrumentality of the state, a body corporate and politic, perpetual in duration and having a seal, to be known as the trustees of the water-power resources on the St. Lawrence River." The trustees shall be five in number, one to be appointed annually for a term of five years. They shall have the power of condemnation, may hold, own or lease property, and may borrow money by bonds secured by the revenue from any property held, provided that the natural water-power resources shall be inalienable.

The commission is required to report back to the legislature not later than Jan. 15, 1931. Recently it announced the appointment of a board of engineers consisting of Lieut.-Gen. Edgar Jadwin (retired), former Chief of Engineers; Silas H. Woodard, New York; O. G. Thurlow, chief engineer of the Alabama Power Co.; and Frederick Stuart Greene, superintendent of the state department of public works. The commissioners are: Robert M. Haig, chairman, Thomas F. Conway, Frederick M. Davenport, Samuel L. Fuller and Julius H. Cohen, counsel for the Port of New York Authority.



LOG BARGE WRECKS BRIDGE SPAN AT VANCOUVER

The span of the Second Narrows bridge across Burrard Inlet at Vancouver, B. C., being slowly lifted out of position by the log carrier "Pacific Gatherer" on Sept. 19. Soon after the photograph was taken, the span was forced into the water. Desperate efforts by tugs were of no avail to pull the freighter from under the bridge, as the rising tide proved too strong. The accident was noted in last week's issue, p. 507.

Contract Let for Hood River Municipal Lighting System

A further step taken by the city of Hood River, Ore., to build its own street-lighting system and supply the power therefor from a municipal plant is recorded in the awarding of the contract for the installation of the distribution system to J. C. Roberts, Spokane, on a bid of $25,985; the contract for the power house to the Apple City Electric Co., Hood River, for $1,942.60; and to the Pelton Water Wheel Co. for waterwheel and generator for $5,229. In the election last May the citizens voted $42,000 in bonds for the project.

The generating equipment is to consist of a 110-hp. waterwheel with a 75-kw. generator. The water to be used is that flowing into the city's new domestic water system reservoir. Stevens & Koon, consulting engineers, Portland, designed the project and will supervise its construction.

Speed Characterizes Preliminary Work on Hoover Dam

Speed all along the line will characterize the construction of Hoover dam, it is announced by the Bureau of Reclamation. The commissioner of reclamation at Washington has authorized the chief engineer at Denver to appoint 50 engineers, principally civil, but a few electrical and mechanical, for preliminary work on designs and estimates. The Civil Service Commission is establishing time records in supplying eligibles for these positions. A few weeks after the commission received the call for the junior engineers, the examination process was completed and names of the eligibles were in the hands of the commissioner of reclamation. The higher grades of engineers, for which the call was made later, will be ready for certification in a few weeks more.

Contracts for preliminary construction and development work will be awarded soon. Contracts for the major features will not be let for a year or more. The Bureau of Reclamation regards it necessary to emphasize this to correct a general impression that a large construction force is to be organized at once or is already at work. It is expected that practically all construction work will be let to private contractors. Under this plan the contractors will make the greater number of employments.

Engineering Societies Meet at National Metals Congress

Several societies interested in metallurgical and mechanical engineering combined in holding the National Metals Congress at Chicago Sept. 22 to 26, under the management of the American Society for Steel Treating and including an extensive exhibition of metals and machinery. These societies, which held their meetings separately, included also the American Welding Society (whose proceedings are reported elsewhere), the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the Gas Products Association and the International Railroad Blacksmiths Association.

A long program of the American Society for Steel Treating included a paper of particular interest on corrosion-resistant alloy cast iron containing nickel, copper and chromium, by J. S. Vanick and P. D. Merica (International Nickel Co.). Although highly resistant to corrosion and heat, it is said to be of low cost and easily machined, its characteristics being very similar to plain cast iron. It is being used extensively for pumps and pipe fittings handling crude oil and salt water, and also for furnace parts and electrical and signal fittings. Fatigue tests with a machine designed for testing small specimens, having a critical diameter of 0.05 in., indicate that as compared with tests on larger machines there is no appreciable effect due to size up to a diameter of 2 in. This

special machine was designed partly for general investigations and partly for tests where only a small amount of material is available, as in the case of broken turbine blades or machine parts.

Developments in casing for deep wells were reviewed by F. W. Bremmer (Standard Seamless Tube Co.) at a meeting of the American Institute of Mining and Metallurgical Engineers. In a session devoted to iron ores, one of the important subjects was the improvement of lean ores by crushing, screening, leaching or other operations in order to make them economically available, since there are vast deposits of ores of this class. Such treatment was considered also in its relation to blast furnace operation.

Protection of ore-handling bridges from wind effects by semi-automatic devices was a subject before the American Society of Mechanical Engineers, by C. O. Burton (Minnesota Steel Co.). This program included also papers on large welded pipe, by Leon Cammen (consulting engineer, New York), and the repair of worn parts by electric deposition of metal, by T. P. Thomas (Westinghouse Electric & Mfg. Co.).

At the Metal Exposition, held in conjunction with the congress, interest was centered on the multiplicity of applications of the newly developed alloys and on the scientific equipment now available for testing. New types of welding wire and wire coatings having special properties were in evidence and pressure regulators and automatic safety valves were exhibited by the gas welders. Portability and simplification were the most noteworthy features of the new equipment.

Luncheon Reception Given to Baron Chuzaburo Shiba

On Sept. 23 at the Engineers Club in New York City a luncheon reception was given to Baron Chuzaburo Shiba, member of the House of Peers, director of the Aeronautical Research Institute of Japan, Tokyo Imperial University, and vice-president of the World Engineering Congress. The reception was attended by the president, members of the board of directors, past officers and friends of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers and American Institute of Electrical Engineers. George Otis Smith presided.

Court Upholds Law Compelling Citizens to Work on Roads

Judge Willis, of the court of appeals of Kentucky, has upheld the right of a justice of the peace to issue warrants for the arrest of men who fail to work public roads of a county in compliance with an order of the fiscal court. Six Elliott County citizens who had been served with warrants for refusing to work the roads sought to have the act declared invalid.

Washington Bridge at Providence Dedicated Sept. 25

The new Washington bridge spanning the Seekonk River between Providence and East Providence, R. I., was officially opened and dedicated on Sept. 25. The structure consists of twelve reinforced-concrete arches and one 150-ft. double-leaf bascule span totaling, with approaches, 2,408 ft. It carries a 60-ft. roadway and two 10-ft. sidewalks. The engineer and architect gave much consideration to the appearance of the structure. It is faced with granite throughout and the 40 ornamental bronze light standards with their massive lanterns, together with bronze flagpoles and the dedicatory plaques, were cast by Gorham, silversmiths.

The contract was awarded July 14, 1928, at a price of $2,984,000. The bridge was completed approximately one month ahead of contract time. Clarence W. Hudson, New York, was consulting engineer and Carl L. Otto, New York, was consulting architect on the project. Merritt-Chapman & Scott Corporation, New York, held the contract for both substructure and superstructure.

WASHINGTON NOTES

By Paul Wooton
Washington Correspondent

Home-Building Conference Begins Work—Gen. Brown to Experiment With Wooden Piling for Revetment

FULLY aware that its recommendations will have a profound influence on the expenditure of 25 billion dollars by American families in new homes during the next decade, the Conference on Home Building and Home Ownership, appointed by President Hoover, is drafting its program for studying all the financial, economic, social, civic and technical problems involved in adequate housing. The planning committee of the conference met in Washington on Sept. 24 to consider organization.

Committees will be formed representing every major phase of the inquiry to function with the co-operation of all existing agencies in their particular fields. Financiers, bankers, insurance companies, building and loan associations, engineers, architects, contractors, realtors, building supply dealers and manufacturers, city planners, public utilities, industrial and trade groups and the women folk will be called in to make their contribution to a study, the objective of which, as defined by President Hoover, is to enable "anybody of sound character and industrious habits to provide himself with adequate housing and preferably to buy his own home."

Another meeting of the planning committee will be called in the near future. The conference is expected to report its findings in about a year.

The Business Outlook

The wide publicity and ready acceptance of bearish rumors during the past week have tended to add to the unsettlement of commodity markets and to obscure a number of favorable statistical indications in the business situation. Basic production, as evidenced by steel activity, building construction, bituminous coal and electric power production, has shown signs of resistance to further decline, while trade activity, evidenced in check payments and car loadings, has indicated about the usual seasonal strengthening.

—The Business Week, Oct. 1.

Mississippi River Commission to Be an Advisory Body

Because of the fact that the flood-control act relegated the Mississippi River Commission to the comparative inactivity of an advisory body, official Washington has not exhibited great interest in the recent appointment of Lawrence A. Glenn, of Murphysboro, Ill., as a member. The flood-control act states that the project shall be prosecuted by the Mississippi River Commission under the direction of the Secretary of War and the supervision of the Chief of Engineers.

Whatever the intent of the act, the interpretation has been placed upon it that the commission should divest itself of all of its former executive activities. President Hoover on numerous occasions has expressed the opinion that commissions, while extremely valuable for research activity, are not good administrative agencies.

It is also provided in the flood-control act that reports on the work shall be sent to the Mississippi River Commission before being transmitted to Congress. The commission may make a supplemental report if it desires. It is generally believed, however, that the commission has definitely passed out of the picture and that the part that it takes in flood-control matters from now on will be purely nominal. Mr. Glenn will be the non-engineer member of the commission. According to the law one of the civilian members must not be an engineer. He will take the place formerly held by John W. Stipes, of Illinois.

Wooden Piling for Revetment

As the result of his recent inspection trip down the Mississippi from St. Paul to New Orleans, Gen. Lytle Brown, Chief of Engineers, was impressed with the difficulties encountered in holding revetment work. In many locations he noticed that the concrete revetment work has been partly washed away, and concluded that in view of the expense of revetment work it may be well to try other means of protecting the banks.

General Brown believes that lines of wooden piling driven into the banks at intervals, flush with the ground, may prove more effective than thin layers of concrete slabs and will cost less. This

piling would be, extended into the deepest part of the bottom of the river near the shore. It would not be necessary to grade the banks over large sections for this piling, as is done before concrete revetment slabs are placed in position.

Instead of grading the entire bank to cut down the slope, General Brown points out, it would be necessary only to dig trenches at appropriate intervals for the lines of piling. Whether this method will successfully replace revetment work remains to be seen, but the general feels that the experiment is well worth trying. No new equipment would be called for and the only material necessary—the timber—is abundant in the lower valley.

Obituary

ANDREW MOORE, one of the founders of the Moore Shipbuilding Co. and president until his retirement at the close of the World War, died in Berkeley, Calif., Sept. 24, at the age of 76. He was a pioneer California engineer, and among his activities in that capacity he supervised the installation of the mining hoist and pumps in the old Comstock mine at Virginia City, Nev., the latest and largest mining equipment installed up to that time; he was closely associated with the development of the Spring Valley water system, its Crystal Springs reservoir, and the pipe lines into San Francisco. He supervised the construction of the first mills of the Hawaiian Commercial Sugar Co. in the Hawaiian Islands, and following completion of the work, he was retained by the Spreckels interests to manage and develop the Paahau Plantation Co., of Hawaii, a position which he held for fifteen years, and he later managed the Kilauea Sugar Co. for the same interests.

ADOLF DALLY, of Detroit, Mich., an engineer and instructor at the tractor plant at Stalingrad, Russia, died on Sept. 4 in the Russian city. Mr. Dally, who was 38 years old, had served in a similar capacity at the Fordson tractor plant at Cork, Ireland.

MAXWELL C. BYERS, 52 years old, president of the Western Maryland Railway, was found shot to death in his office in Baltimore on Sept. 23. In the same office was found Dudley G. Gray, 61, vice-president of the company, dying from bullet wounds. He succumbed at a hospital a few hours later. There were no witnesses to the shooting, but the coroner held that Mr. Gray killed Mr. Byers and then ended his own life. From 1897 to 1902 Mr. Byers served as an assistant engineer on various divisions of the Pennsylvania Lines West of Pittsburgh. In 1902 he became assistant engineer of maintenance-of-way for the Baltimore & Ohio Railroad and was appointed division engineer the next year. From 1904 to 1909 he filled the positions of assistant engineer of maintenance-of-way, assistant to the general manager and engineer of maintenance-of-way for the St. Louis & Santa Fe Railroad. He served as chief engineer of operations for the same company from 1909 to 1913, in the last-named year becoming assistant to the president of the Great Northern. In 1920 Mr. Byers was made president of the Western Maryland.

GEORGE L. CAMPEN, U. S. government inspector in charge of federal aid for paved roads in Iowa, died suddenly last week in Omaha, Neb., while at the wheel of his automobile. He was 63 years old. In his early engineering career Mr. Campen was in charge of construction and repair of sewers and paving in Lincoln, Neb., and from 1901 to 1906 was city engineer of that city. In 1905-06 he was water commissioner of the Canal Zone, in direct charge of preparation and carrying into effect rules for sanitary installation of plumbing, use of water, maintenance of service connections and protection of paving in Panama and Colon. From 1906 to 1909 he was superintendent of public works of the Canal Zone. In 1909 he went to Nebraska and became assistant city engineer of Omaha before accepting the position with the United States government.

EDWARD W. BEMIS, well known as an economist and an expert in appraisals of public utilities, died at Springfield, Mo., on Sept. 25. He was born at Springfield, Mass., in 1860, and was graduated from Amherst College in 1880 and Johns Hopkins University in 1885. He began his work as professor of history and political economy at Vanderbilt University in 1889, going then to the University of Chicago as associate professor of social economics in 1892, to the Illinois State Bureau of Labor Statistics as assistant statistician in 1896, and to the Kansas State Agricultural College as professor of economic science and history in 1897. He turned then to practical affairs and became superintendent of the water department at Cleveland, Ohio, in 1901; superintendent of the municipal electrical department of that city in 1909, and deputy commissioner of water supply, gas and electricity of New York City in 1910. In private practice he was engaged by numerous cities in appraisals and suits relative to the adjustments of rates for water, gas and electric service. From 1913 to 1923 he was a member of the advisory board of the valuation bureau, Interstate Commerce Commission. He was the author of two books: "Municipal Monopolies" and "Municipal Ownership of Gas Works," besides being a prolific writer on subjects relating to municipal government.

Society Calendar

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, Washington, D. C.; annual meeting, Pittsburgh, Pa., Nov. 17-20.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, New York City; Pinehurst, N. C., Oct. 27-28.

AMERICAN IRON & STEEL INSTITUTE, New York City; semi-annual meeting, New York City, Oct. 24.

AMERICAN PUBLIC HEALTH ASSOCIATION, New York; annual meeting, Fort Worth, Tex., Oct. 27-30.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS, St. Louis, Mo.; annual convention, Richmond, Va., Oct. 13-17.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York; fall meeting, St. Louis, Mo., Oct. 1-3.

ASPHALT PAVING CONFERENCE, New York City; ninth annual conference, Memphis, Tenn., Dec. 1-5.

INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS, Chicago; conference, Louisville, Ky., Oct. 9-11.

INTERNATIONAL ROAD CONGRESS; Washington, D. C., Oct. 6-11.

NATIONAL SAFETY CONGRESS, Chicago; annual meeting, Pittsburgh, Pa., Sept. 29-Oct. 3.

SOCIETY OF INDUSTRIAL ENGINEERS, Chicago; national convention, Washington, D. C., Oct. 15-17.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS has announced that the tellers of election have canvassed the ballots for officers and that the following were elected: president, Roy V. Wright, managing editor, *Railway Age*, New York; vice-presidents, William A. Hanley, chief engineer, Eli Lilly Co., Indianapolis, Ind.; Thomas R. Weymouth, president, Oklahoma Natural Gas Corp., Tulsa, Okla.; Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J. Representatives elected to American Engineering Council are: W. R. Webster, Bridgeport, Conn.; R. V. Wright, New York City; J. W. Roe, New York City; Robert Yarnall, Philadelphia; E. N. Trump, Syracuse, N. Y.; B. E. Hull, Houston, Tex.; E. O. Eastwood, Seattle, Wash.; W. Trinks, Pittsburgh, Pa.; Warner Seely, Cleveland, Ohio, and Willian S. Conant, Washington, D. C.

COUNTY COMMISSIONERS AND COUNTY ENGINEERS of the State of Washington, held their 24th annual convention in Vancouver Sept. 18-20. The following officers were elected by the county commissioners; president, Don Evans, King County; vice-president, E. R. Riley, Yakima; secretary-treasurer, A. L. Collins, Spokane. Officers elected by the county engineers were: president, E. R. Smith, Walla Walla; vice-president, Charles Deako, Clark County; secretary-treasurer, J. C. Stegner, Pend Oreille County. The next convention will be held in Spokane, dates to be announced later.

JOINT ANNUAL MEETING of the North Carolina section, American Water Works Association, and the North Carolina Sewage Works Association will be held in Hendersonville, N. C., Oct. 13-15. H. G. Baity, Chapel Hill, N. C., is secretary.

NEW YORK SECTION, American Water Works Association, will hold its regular meeting in Watertown on Oct. 9-10. Papers to be read are as follows: "The Watertown Water Distribution System—Its History and Development," by Harold J. Haley, superintendent, water department, Watertown; "Watertown Water Supply and Its Treatment," by F. H. Jennings, city chemist, filter and pumping plant, Watertown; "Selecting Meters of Size Suitable for Customer's Needs," by F. P. Berry, chief engineer, American Consolidated & Securities Co., New York; "Effect of Recent Drought on New York State Water Supplies," by Earl Devendorf, assistant director, division of sanitation, department of health, Albany; "The Addition of Mixing Chambers to Older Filter Plants," by R. G. Yaxley, superintendent, water commissioners, Waterford; "Anchor Ice Troubles," by Charles H. Lord, engineer, board of public control, Ogdensburg. There will also be a superintendents' round table discussion, which will be opened by William T. Field, consulting engineer, of Watertown, with a talk on "Rate Structures and Metering."

TEXAS SECTION, American Society of Civil Engineers, will hold its fall convention in Houston, Oct. 24-25. J. C. McVea is chairman of arrangements.

Construction Equipment and Materials

Diesel Truck Makes Test Run

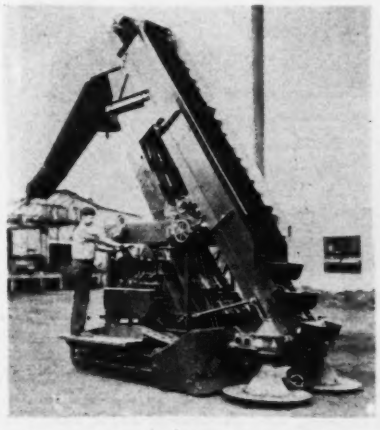
Highway transportation possibilities of the diesel engine were demonstrated in a trip recently completed from Lansing, Mich., to Nyack, N. Y., and return, 1,478 miles, by a Reo Speed Wagon specially equipped with a four-cylinder 3½x6-in. diesel engine manufactured by the Hill Diesel Engine Co., of Lansing. Aside from the change in power plant the truck was standard, with a net weight of 4,300 lb. The load on the easterly trip was 2,300 lb.; on the return trip, 1,200 lb. Fuel used, totaling 74 gal. for 1,478 miles, cost $5.02, equivalent to 0.339c. per ton-mile of pay load.

New Developments

Bucket Loader With Capacity of 2 Cu.Yd. Per Min.

As an addition to its standard line of crawler and wheel type bucket loaders with capacities ranging from 1 to 1¾ cu.yd. per minute, the Barber-Greene Co., Aurora, Ill., has announced the model 62 crawler-mounted bucket loader. This machine has a height of 19 ft. 4 in., a clean-up width of 7 ft. 6 in., and a capacity of 2 cu.yd. per minute. It is a crawler-mounted, power-propelled, one-man loading unit, designed for work wherever loose bulk material need be handled. It can feed from the bank or from stockpiles, and when equipped with one of several different types of Barber-Greene proportioning hoppers, it is excellent for batching on paving jobs. It may also be had with grizzly or power-vibrated screen for screening gravel, stone or coke.

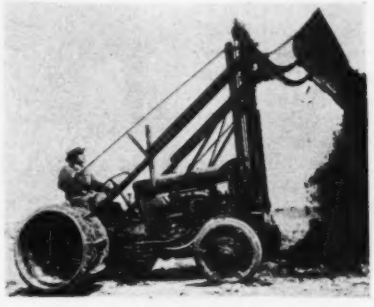
Many of the standard B-G features appear on the new machine. Steering levers, master clutch pedal, transmission shift lever, power boom hoist lever, bucket line drive lever, crawler speed change lever and scraper hoist wheel are all centered about the operator's platform. For insurance against strains due to overload, the patented overload release sprocket is provided. The loader feeds itself by means of two large 42-in. disks that revolve inward toward the buckets. These disks are flat on the ground and slide under the pile or into the bank, crowding enough material onto the buckets to keep the machine working at capacity. A floating, adjustable scraper cleans a path 7 ft. 6 in. wide, an important feature in loading from stockpiles where a clean pick-up is desired. The patented floating boom is designed so that the thrust from the feeding end is transmitted directly to the crawlers.



HEAVY-DUTY BUCKET LOADER

Shovel Attachment for Tractors

For mounting on the Allis-Chalmers model U tractor with either wheel or crawler equipment, the W. M. Blair Mfg. Co., Chicago, Ill., has announced a hydraulic digger with a bucket of ½-yd. capacity. The unit has a total lift of 90 in. and a dumping clearance of 6½ ft. Control is by means of a seamless steel cylinder with a 5½-in. piston, to which oil is supplied by a pump mounted on the side power take-off of the tractor.



½-CU.YD. TRACTOR SHOVEL

Two Heavy Truck Models Drive Through Four Wheels

Four-wheel-driven trucks with capacities of 5 and 7½ tons have been added to the line of the Four Wheel Drive Auto Co., Clintonville, Wis. Both models, known as the Super-Five and the Super-Seven, have wheelbases of 165 in., and are driven by six-cylinder motors. The smaller develops 102 and the larger 127 b.hp. at 2,000 r.p.m. Each truck is equipped with a selective sliding gear, four-speed main transmission supplemented by a two-speed planetary auxiliary transmission, giving a range of eight forward and two reverse speeds. Full-floating, double-reduction axles are used, the first reduction through a pair of beveled gears, the second through spur gears. All of these are inclosed and run in oil. Easy steering is obtained by the use of two tapered roller bearings at each axle end and a roller-mounted cam and lever steering gear. While both models have Tru-Stop emergency brakes mounted on the hubs of the upper transfer case sprockets, the two differ in the service brake installations. On the 5-ton truck this is of the Bendix four-wheel type, operating in connection with a BK booster. On the Super-Seven consideration is given to the probability of using a trailer, consequently the service brake system is of the Westinghouse air type, operating on rear wheels only.

POWER APPLIED TO ALL WHEELS OF 7½-TON TRUCK

German Process Grouts Porous Materials by Chemical Means

A chemical process now being introduced into the United States by K. G. Frank, 75 West St., New York City, has for its object the solidifying and tightening of sandy or granular masses by introducing suitable chemical solutions, which react with one another to produce this effect. This method is best suited for sand, but it is also applicable to loose rock, quicksand and other materials of a porous nature. It can be used to depths of approximately 80 ft. and is not affected by groundwater. Injection pipes are inserted into the mass to be solidified and the chemicals are pumped in under pressure until the mass is fully impregnated. The solidified mass is said to be quite uniform, able to withstand a compressive stress of about 650 lb. per square inch, and impervious to water.

Many advantages are claimed for the new process, which was developed in Germany. These include minimum shrinkage, uniform settlement under load, no delay before setting, full penetration of the solutions into the finest voids, equal efficiency in either wet or dry ground and resistance to disintegration by water.

Controlling Remote Electrical Apparatus by Sound Waves

Equipment for the control of remote electric devices by means of audio-frequency impulses is now being produced on a commercial scale by the General Electric Co., Schenectady, N. Y. Operation and signal indications are by means of audible sounds, in contrast to previous methods using visual indications. The new control equipment can

be applied in many different ways for the supervision and remote control of practically any kind of electrical apparatus, such as units in automatic generating stations and in pumping plants, gate-controlling and water-level indicating apparatus, and many others.

Only two line wires are used, which may parallel high-tension power lines without difficulty, since the equipment operates through insulating transformers. Equipment located in the dispatcher's office consists of a wall panel on which are mounted a calling dial similar to those used on dial telephones, a reset key, a howler and an audio-frequency transmitter. Equipment in the station to be controlled consists of selector switches, auxiliary relays and other units necessary to adapt the supervisory system to the control circuits of the devices supervised. Whenever the dispatcher desires to operate a unit, such as a pump, located in the outlying station he dials the proper code to select that unit. A series of audio-frequency impulses are thus transmitted over the line wires to the selector switches in the outlying station. The selector switches take a position corresponding to the numbers dialed and start a code-sending device which checks the position of the selectors by sending a return code to the howler in the dispatcher's office. This code return is the same as the code dialed. The howler has two tones, high and low pitched, the one indicating that the pump is running and the other that the pump is stopped. Thus the dispatcher, knowing the selector switches are set on the position corresponding to the pump he wishes to operate and knowing whether the unit is in the open or closed condition, can now dial a signal to start or stop the unit. He immediately receives a signal via the howler to indicate that the desired operation has taken place.

When any change in the electrical condition of a supervised unit occurs, a signal is automatically sent to the howler in the dispatcher's office. From the code and tone received he can tell immediately what has taken place. If more than one automatic operation takes place simultaneously, audible signals are sent to the dispatcher via the howler one at a time.

Driver for 3-In. Sheeting

A new and larger air-operated pile-driver that will drive 3-in. sheetpiling has been announced by the Ingersoll-Rand Co., New York City. This tool, the R-30, weighs 148 lb. It can be readily carried by two men and can be operated by one after it has been placed in position. By adding removable cheek plates, it can be used to drive 2½- and 2-in. piling as well as 3-in. The R-30 is designed for use on all excavation jobs where heavy sheetpiling is required. It eliminates most of the splitting of piles, permitting the same piece to be used several times. It is low in air consumption: a 7x6-in. portable compressor will operate two tools. There are no exterior moving parts, which makes it safe to use. The R-30, according to the manufacturer, will do much of the work that has formerly required steam hammers weighing as much as 400 lb. It is equipped with a removable foot-piece so that the operator can add his weight to the tool.

AIR HAMMER

Business Notes

INDEPENDENT PNEUMATIC TOOL Co., Chicago, Ill., announces the following personnel changes: W. A. Nugent, manager of the St. Louis office, will be transferred to Chicago as manager of the Chicago territory; F. J. Passino, manager of the Pittsburgh office, will be manager at St. Louis; T. J. Clancy, of the Cleveland office, will be transferred to Pittsburgh as manager.

DIVISION OF SIMPLIFIED PRACTICE, U. S. Bureau of Standards, announces that Simplified Practice Recommendation R26-30—Steel Reinforcing Bars—may now be considered as effective, inasmuch as signed acceptances have been received from a sufficient number of manufacturers, distributors and users to insure the general adoption of the program by the industry as a whole.

LINK-BELT Co., Chicago, Ill., has appointed R. H. MacNeal Southern district manager of the crane-shovel-dragline division, with headquarters at Birmingham, Ala.

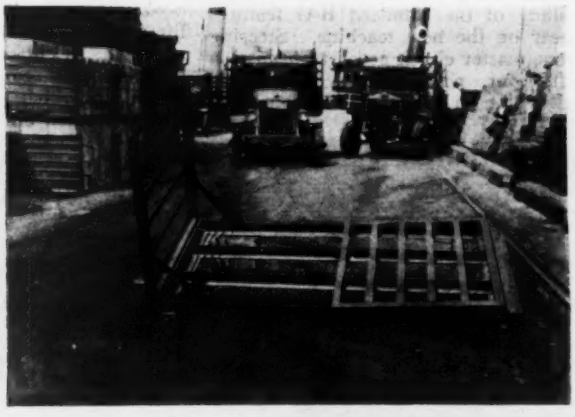
J. H. WILLIAMS & Co., Buffalo, N. Y., has consolidated its general office and mail sales office (exclusive of sales of special drop forgings to order) with its present Eastern sales office and warehouse at 75 Spring St., New York City. A service department will be retained at Buffalo to represent the sales department at the factory.

PUMP EQUIPMENT & ENGINEERING Co., 427 Cambridge St., Allston, Mass., has been formed by George E. Freethy, formerly New England district sales manager for the Worthington Pump & Machinery Corp. The new organization will handle the Worthington line of pumps, air compressors and industrial meters, as well as miscellaneous power plant equipment.

TRACKSON Co., Milwaukee, Wis., is now prepared to supply single- and double-drum portable hoists, similar to the model described in *Engineering News-Record*, Sept. 18, 1930, p. 476, for attachment to Case industrial and agricultural tractors, models CI and C.

AUTOMOTIVE PRODUCTS Co., distributor of Hercules engines and power units in Great Britain and continental Europe, exclusive of U.S.S.R., is now located at Brock House, Langham St., London, W.1, England.

FRANK W. TAYLOR, superintendent of the turbine division of the General Electric Co., Schenectady, N. Y., died on Sept. 17 at his home in that city. He had been connected with the General Electric Co. for a number of years. Mr. Taylor was a former resident of Baltimore and was graduated from McDonogh School and from the school of electrical engineering of Johns Hopkins University.



CONTAINERS CARRY HOLLOW TILE FROM FACTORY TO BUILDING

Collapsible steel containers, 3x7 ft. in size and 4 ft. high, are used by the Fullerton Trucking Co., Inc., New York City, to transport hollow building tile from the factory of the National Fireproofing Co. at Perth Amboy, N. J., to destinations in New York City. The steel crates, each of which carries about 2 tons of material, are brought to the New York waterfront by barge, and from there to the building operation by motor truck, the usual truckload being four containers. After unloading, the crates are collapsed for return to the factory. The present form of container, which is patented, is the result of five years of experimentation by the Fullerton Trucking Co. A similar crate used for concrete blocks appears in the left background of the second illustration.

The Business Side of Construction

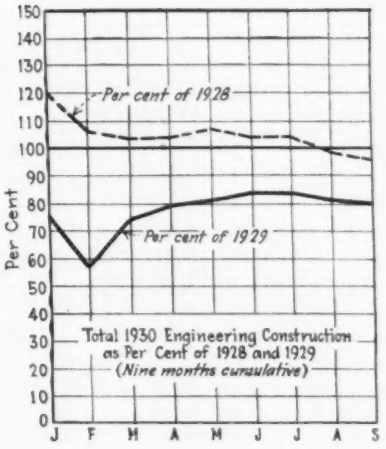
September and Nine Months' Contracts Below 1929 Values

SEPTEMBER contracts for engineering construction totaled $214,000,000, compared with $326,000,000 in September, 1929, and $285,000,000 in 1928. The drop continues to be chiefly in the building field. Subtracting buildings from the total shows smaller differences, the September figures being $104,000,000 for 1930, and $126,000,000 and $137,000,000 for the two preceding years. Public-works contracts aggregate $105,000,000, compared with $150,000,000 a year ago, the decrease being in roads, buildings and unclassified works.

The nine months' total of $2,568,072,000 is 20 per cent below the 1929 figure. But, as this year's construction dollar is buying a larger unit of structure than in recent years, the drop in physical volume of engineering construction is only about 15 per cent.

In the public-works group, streets and roads total $478,000,000 for the first nine months, compared with $435,000,000 in 1929, and amounted respectively to 40 and 44 per cent of the total for the two years. Other public-works contracts totaled $603,000,000, compared with $640,000,000 last year, due to smaller lettings for public buildings and unclassified work.

Industrial building, though only 69 per cent of the record value in 1929, is 18 per cent more than that of 1928. The unclassified group of engineering construction, including railroad and public-utility work, tunnels, dams, wharves and pipelines, has been particularly active this year, contracts being 10 per cent more than in 1929 and 220 per cent more than in 1928.

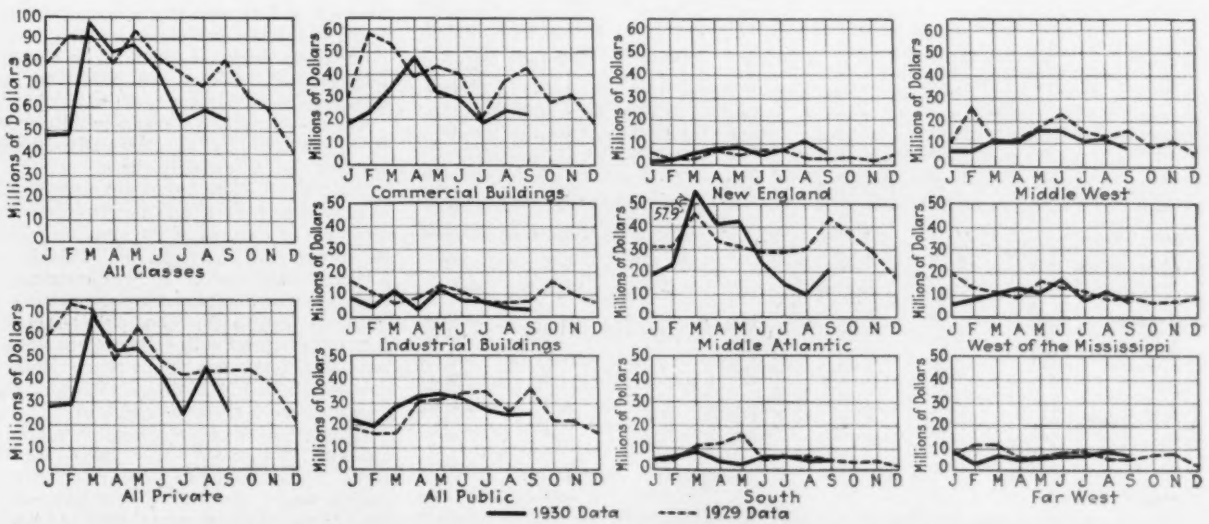

Per cent of 1928
Per cent of 1929
Per Cent
Total 1930 Engineering Construction as Per Cent of 1928 and 1929
(Nine months cumulative)
J F M A M J J A S

Among the large projects reported in September in the planning stage, but not ready for estimate, were a $27,600,000 power development in California and Oregon, $5,000,000 to $8,000,000 harbor improvements for Berkeley, Calif., a $3,000,000 power job in Alaska, a $13,000,000 railway extension

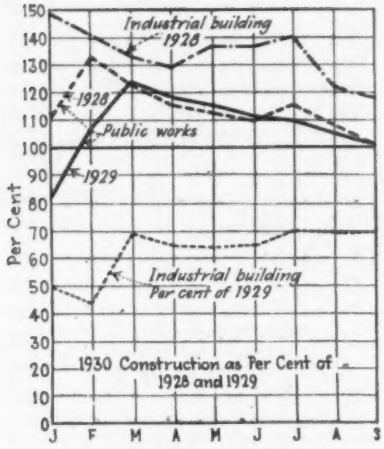
ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN SEPTEMBER, 1930

Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States Sept., 1930	United States Nine Months 1930	United States Nine Months 1929	Canada, Sept., 1930
Water-works	$90	$518	$443	$956	$510	$717	$3,234	$35,291	$34,964	$30
Sewers	976	1,761	814	3,907	814	392	8,864	65,723	68,245	159
Bridges, public	971	2,240	2,334	1,154	2,144	535	9,378	82,089	75,704	1,444
Excavation	766	147	1,422	3,045	491	167	6,038	21,038	24,928	1,462
Streets and roads	2,138	10,837	5,617	10,485	7,854	4,670	41,601	477,659	435,530	629
Federal government	73	3,356	4,011	775	1,126	742	10,083	86,607	90,146	.....
Unclassified, public	219	5,608	22	302	601	410	7,162	85,034	106,109	3,579
Buildings, public	4,052	4,530	661	5,332	3,146	1,092	18,813	227,244	239,425	675
Total public	9,285	28,997	15,324	25,956	16,686	8,725	104,973	1,080,685	1,075,051	7,978
Buildings, industrial	1,117	7,834	359	3,384	3,197	1,750	17,641	274,431	399,999	3,618
Buildings, commercial	8,160	46,617	606	5,194	4,825	8,090	73,492	824,760	1,393,133	723
Bridges, private	4,050	1,700	.....	.....	.....	.....	5,750	17,261	34,721	.....
Unclassified, private	250	1,056	430	550	2,558	7,500	12,344	370,935	318,601	3,280
Total private	13,577	57,207	1,395	9,128	10,580	17,340	109,227	1,487,387	2,146,454	7,621
SEPTEMBER TOTAL, 4 weeks	**22,862**	**86,204**	**16,719**	**35,084**	**27,266**	**26,065**	**214,200**	.....	.....	**15,599**
August, 1930, 4 weeks	47,823	41,104	19,239	54,107	43,912	33,407	239,592	.....	.....	29,504
September, 1929, 4 weeks	14,289	175,173	16,157	65,286	35,148	19,728	325,781	.....	.....	9,224
9 months, 1930	223,048	1,053,047	207,355	431,753	392,529	260,340	.....	2,568,072	.....	146,337
9 months, 1929	188,538	1,324,107	291,390	639,463	482,439	295,568	.....	.....	3,221,505	156,534



CONTRACTS AWARDED, SHOWING TREND BY CLASSES AND SECTIONS


Industrial building 1928
1928
Public works
1929
Industrial building Per cent of 1929
1930 Construction as Per Cent of 1928 and 1929
Per Cent
J F M A M J J A S

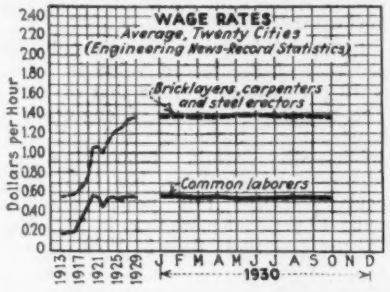
in Texas, dams worth $2,500,000 for that state, a $10,000,000 water-works dam for Pasadena, $2,650,000 water-works for Seattle, sewage-disposal plants worth $12,000,000 for Cleveland, $2,450,000 for Oklahoma City and $1,000,000 each for Dallas and Richmond (Ind.), a $10,000,000 office building and a $9,000,000 freight terminal in New York; total for the thirteen projects, $100,000,000.

Slight Upturn in Employment

In Toronto the Bricklayers and Stone Masons Union, the Builders' Exchange and the General Contractors Association have agreed to a three-day week with a division of available work among the craftsmen during the period of depression. Another measure to reduce the number of those unemployed is seen in the restriction of immigration. Orders to refuse visas to prospective immigrants likely to become public charges have been issued to all American consuls.

Canadian labor unions have asked the dominion government to place restrictions on immigrant laborers similar to the action taken in the United States. That the federal government has further aided in reducing unemployment is seen in the employment figures on federal-aid road projects, which show 35,800 men at work now, compared with 34,500 a year ago—a gain of 4 per cent.

On state highway work, New York road contractors in the week ended Sept. 9 laid 41.15 miles of pavement, compared with following figures for the corresponding week in other years: 39.36 miles in 1928; 28.30 in 1929; 27.89 in 1927; 22.3 in 1925; 20.03 in 1926.


WAGE RATES
Average, Twenty Cities
(Engineering News-Record Statistics)
Bricklayers, carpenters and steel erectors
Common laborers
Dollars per Hour
1913 1917 1921 1925 1929
J F M A M J J A S O N D
1930

Contractors say that good weather and the plentiful supply of laborers made this possible.

At least five instances of increased plant operation or hiring of additional help in industries were reported in September. The R.C.A.-Victor Co., of Camden, N. J., increased its forces Sept. 19 from 4,000 to 22,000 and gave employment a vigorous boost in the city, which the census reported third in the number of unemployed.

The Philadelphia Storage Battery Co. is adding 75 workers a day to its payroll. The workers now number 4,000, compared with 2,500 in May. New orders are running well ahead of last year's volume.

The Reading Iron Co. reopened its charcoal-iron plant early in September, taking back 175 men to full time of ten hours a day. The men had been idle since July; 300 more will have returned to work before the end of this week.

A Youngstown pipe plant put its three units of electric-welding equipment on full capacity, to supply orders from Southwestern natural-gas interests. The American Sheet & Tin Plate Co., Monessen, Pa., put its 25 mills into full operation on Sept. 7. The operating rate had been as low as 50 per cent of capacity during the summer; more than the regular force is now needed.

Construction Employment in Important Cities

Portland (Ore.) — Agricultural employment active; building slow. Skilled building mechanics are reported working as common laborers, and are not asked to show union cards. One lumber company has cut wages 10 per cent and reduced working hours from three eight-hour shifts to three three-hour shifts, in an effort to spread the work among all men.

Seattle—A few lumber mills and camps are reopening, with small crews and with wages as low as possible.

Denver — Nearly three-quarters of union members now have employment, but strength of organization is jeopardized by constant offers of non-union men to work 25 per cent below scale.

St. Louis—About 300 plumbers are locked out in a dispute over the demand that all pipe be cut and threaded on the job instead of at the supply houses. Master plumbers are using non-union men.

Kansas City—Hoisting engineers on strike against hiring non-union men on a viaduct project.

Chicago—Architects say business is the dullest in fifteen years. Masons, 20 per cent unemployed; steel workers, 10 per cent.

Cleveland—September building contracts gained $3,000,000 over August.

Detroit—Only those who have been residents of Detroit for the last year will be employed on new municipal projects.

Birmingham—So little building has been done here in the last eighteen months that realtors are predicting a shortage of residences within 90 days.

Dallas—Surplus of common laborers is aggravated by an unusually large number of idle cotton pickers.

New York—The board of transportation is enforcing a law governing employment of citizens of the state on public work. As a result, 500 outsiders formerly employed on subway construction were displaced during September. Painting contractors on public-school jobs are charged with failure to pay the rate of $12 per day to painters. Subcontractors pay as low as $9 and $10 a day to meet close competition.

Albany—Railroads working on grade-crossing elimination have taken legal action to test constitutionality of "prevailing wage" law, which compels employers to pay the wage scale of the district in which a project is located.

CURRENT BUILDING AND CONSTRUCTION TRADES WAGE RATES PER HOUR
Advances since last month are indicated by **heavy type**, declines by *italics*

Cities	Bricklayers	Carpenters	Hoisting Engineers	Hod Carriers	Pile Drivers	Structural Iron Workers	Common Labor*
Atlanta	$1.25@1.40	$0.60@.70	$0.60@1.00	$0.50	.....	$0.75@1.25	$0.25@.35
Baltimore	1.75	1.00@1.10	1.00@1.37½	1.00	$0.65	1.00@1.25	.30
Birmingham	1.50	1.00	1.25	.50	.....	1.25	.20@.35
Boston	1.50	1.37½	1.37½	.85	1.27½	1.37½	.45@.80
Cincinnati	1.62½	1.40	1.40	1.00	1.40	1.40	.40@.60
Chicago	1.70	1.62½	1.62½	.97½	1.62½	1.62½	.97½
Cleveland	1.62½	1.37½	1.37½	.87½	1.10	1.50	.40@.87½
Dallas	*1.75*	1.12½	1.25	.40 @ .75	1.25	*1.25*	*.30*@.50
Denver	1.50@1.62½	1.25	1.25@1.37½	.87½@1.00	.....	1.25	.62½
Detroit	1.56½	1.00@1.25	1.00@1.10	.90	1.00@1.10	1.00@1.25	.50@.60
Kansas City	1.50	1.37½	1.37½	.90@1.00	1.25@1.37½	1.37½@1.50	.35@.60
Los Angeles	1.37½	1.00	1.00	.75	.87½	1.00	.50
Minneapolis	1.30	.90	.90@1.00	.80	.....	1.00@1.25	.50@.65
New Orleans	1.50	.90	1.25	.75	.80@1.00	1.25	.30@.40
New York	1.92½	1.65	1.92½	1.23½	1.10@1.23½	1.92½	1.03½
Philadelphia	1.75	1.50	1.02½	.70@1.12½	1.00	1.37½@1.50	.40@.50
Pittsburgh	1.75	1.50	1.43½@1.56½	1.12½	.....	1.50	.40@.80
St. Louis	1.75	1.50	1.60@1.75	1.15@1.25	*1.25*	1.75	.40@.87½
San Francisco	1.37½	1.12½	1.12½	.87½	1.12½	1.37½	.68½
Seattle	1.50	1.12½	1.12½@1.25	1.00	1.12½	1.25	70
Average	*1.58*	1.23	1.25	*0.8301*	*1.14*	*1.35*	*0.5596*
Montreal	1.25	.80	.75	.....	.90	1.00	.30@.35

*Minimum rates are non-union and for construction other than buildings.

The railroads claim that their own crews are bound by prior agreements.

Boston—Union mechanics are reported offering to work below the scale for independent contractors. Organized contractors continue to pay the rate but hope to induce the unions to sign up for lower rates.

Manitoba—Building trades workers received wage increases Sept. 11: plasterers, 10c. per hour, to $1.45; plumbers, 5c., to $1.25; steamfitters, 5c., to $1.25; sheet-metal workers, 10c., to 90c.; painters, decorators, paperhangers and glaziers, 5c., to 95c.; terrazzo and tile workers, 12½c. to 90c.; tile workers' helpers, 5c., to 60c.

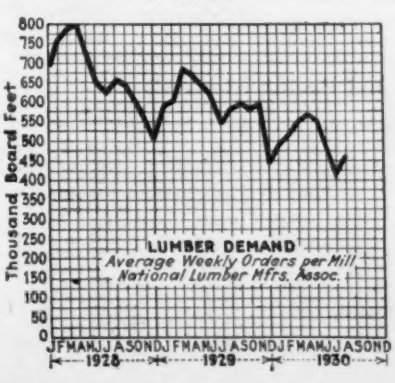
Wage Rates—Skilled building crafts, $1.38⅜ per hour, against $1.39⅛ in September and $1.36⅜ in October, 1929. Common laborers, 55.96c. per hour, compared with 56.09c. in September and 54.96c. in October, 1929.

Some Cities Boosting Prices

Steel erectors, organized as the New York Structural Steel Board of Trade, have advanced by 6 per cent the price of all fabricated materials in place in the metropolitan district, operative on contracts let this month. The erectors claim that recent prices for this work permit no profit. The Pittsburgh mill base on beams is $1.60 ($1.90 a year ago), and it is said that cutting-under has about disappeared.

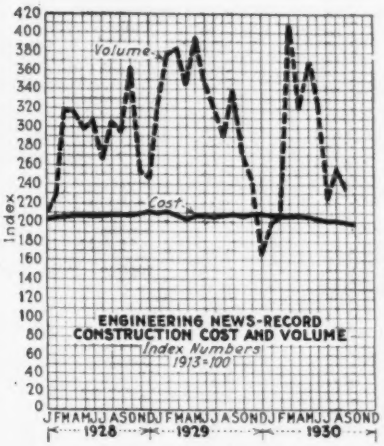
Inquiry for structural steel is below normal for the fall. Awards of the last week in September amounted to only 20,000 tons, the lowest since July. Buying of light rails, chiefly for industrial plants, is heavier now than at any time in the last six months. Railroads are taking track fastenings—spikes, bolts, splice bars and tie-plates—in fairly large quantities. Steam-shovel builders appear as among the most active present users of plates. There is an increase in orders for corrugated galvanized roofing sheets in the rural districts.

In the Pacific Northwest cutting has not exceeded selling during the last few weeks. This is contrary to recent practice in all other lumber-producing areas. The result was a rise on Sept. 15 at Seattle of $1 per 1,000 ft.b.m. (to $21) for Douglas fir 3x12s; $24 a year ago. Otherwise the lumber market is demoralized, though dealers' and distributors' stocks are at record low levels. Dealers will keep stocks low during the coming winter. Mill stocks continue to exceed orders.


Thousand Board Feet
LUMBER DEMAND
Average Weekly Orders per Mill
National Lumber Mfrs. Assoc.
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

Construction Cost and Volume Index Numbers

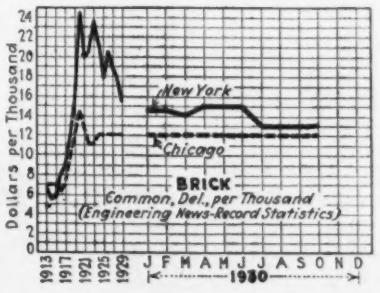
The drop in costs in August of 0.6 per cent has been followed by a further decrease of 0.4 per cent in September due to lower lumber prices and common labor wages. The cost index number is lowest since February, 1923. Volume is below August, 1930, and September, 1929.


Index
Volume
Cost
ENGINEERING NEWS-RECORD
CONSTRUCTION COST AND VOLUME
Index Numbers
1913=100
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

E. N.-R. Cost		E. N.-R. Volume*	
Oct., 1930	**198.72**	**Sept., 1930**	**232**
Sept. 1930	199.58	Aug., 1930	259
Oct., 1929	206.32	Sept., 1929	340
Peak, June, 1930	273.80	1929 (average)	317
1929 (average)	207.02	1928 (average)	287
1913 (average)	100.00		
1929		1929	
January	209.40	January	325
February	210.40	February	378
March	207.78	March	382
April	203.40	April	332
May	205.15	May	395
June	205.65	June	347
July	204.77	July	320
August	205.91	August	290
September	207.57	September	340
October	206.32	October	273
November	208.46	November	245
December	209.46	December	166
1930		1930	
January	208.96	January	199
February	206.46	February	204
March	206.80	March	408
April	207.12	April	320
May	205.86	May	354
June	203.36	June	324
July	200.95	July	226
August	200.95	August	259
September	199.58	September	232
October	198.72		

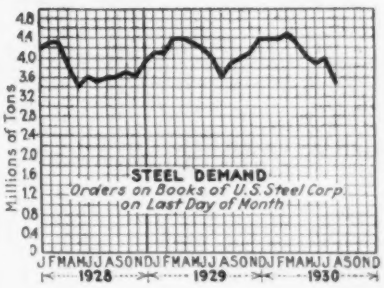
*Corrected for price change since 1913.

While a tariff of $1 per 1,000 ft. did not prevent Russian shipments of lumber to the United States, the absence of a tariff has not brought shipments from Canada. British Columbia, for instance, ordinarily a large shipper of shingles and poles, sent only a little more than 2,000,000 ft. last month, a drop of nearly 29 per cent from a year ago. The retention of low lumber shipping rates by intercoastal steamship lines has enabled dealers in the East to absorb the rise on the West Coast and to quote prices lower than a month ago. Douglas fir 3x12s, for example, are down $2 per 1,000 ft., to $37 delivered to job in Manhattan; $44 a year ago.


Dollars per Thousand
New York
Chicago
BRICK
Common, Del., per Thousand
(Engineering News-Record Statistics)
1913 1917 1921 1925 1929 J F M A M J J A S O N D
1930

Lime, plaster, gypsum products, and aggregates have steady prices, with small call in most localities. The same is true of roofing materials. Cement prices are unchanged except in one or two cities. Clay products as a group are in a weak market with few prospects of immediate betterment.

New York masons' materials dealers insist that prices are at bottom and that if there is need for construction of any kind, this is the time to construct and, moreover, that still lower prices will not help. Last month Chicago dealers, despairing of attracting buyers by price cuts, boosted quotations. This month Atlanta dealers adopted the plan and abandoned a price war of a year's standing. Ten materials have been advanced in price: cement, sand, gravel, crushed stone, tile, brick, lime, asphalt, sewer pipe and rope.


Millions of Tons
STEEL DEMAND
Orders on Books of U.S. Steel Corp.
on Last Day of Month
J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930

In contrast to the price-raising principle, warehousemen in Dallas are trying to clear old stocks before Jan. 1 at cut prices, intending to replenish at even lower prices. The cut is in brick, cement, reinforcing bars, rivets, wire nails, rope and explosives.

A price war is on in St. Louis in sand, crushed stone, brick, steel sheets, wire nails, railway ties and lumber. Quotations, therefore, in the accompanying price pages are nominal.

Paint manufacturers are making extensive inquiries for lead, expecting better business in the next few weeks. Pig-lead prices, meanwhile, hold steady. Plumbing supply houses, lacking this optimism, are buying lead in necessary quantities. The linseed-oil industry is entering a new crop year with a carry-over of raw material smaller than ever before, which may result in higher prices for paint. Price at Minneapolis is 11.5c., compared with 13.6c. in September and 17.3c. in October, 1929.

Current Prices of Construction Materials

Price advances since last month are indicated by **heavy type**; declines by *italics*

Building Materials

PORTLAND CEMENT—Prices per barrel, for cement in cloth, *without charge for bags*, cash discount not deducted. Prices are delivered by truck to contractors, except those marked F.O.B., which are manufacturers'. For cement in paper bags add 15c. per bbl:

	Oct. 2, 1930	One Mo. Ago	One Yr. Ago
Atlanta	**$3.00**	$2.40	$2.35
Baltimore	2.60	2.60	2.40
Birmingham	2.60	2.60	2.40
Boston	2.40	2.40	2.15@2.25
Dallas	2.15	2.15	2.15
Denver	2.61	2.61	2.61
Jersey City	2.60	2.60	2.60
Kansas City	2.60	2.50	2.65
Los Angeles	1.92	1.92	2.42
Montreal	2.20	2.20	1.70
New Orleans	2.65	2.65	2.65
New York	2.10	2.10	2.10
Philadelphia	2.10	2.10	2.20
St. Louis	*1.95*	2.45	2.20
San Francisco	2.64	2.64	2.41
Seattle	2.25	2.25	2.70
(F.O.B.)			
Cedar Rapids	2.23	2.23	2.04
Chicago	1.95	1.95	1.85
Cincinnati	2.14	2.14	1.92
Cleveland	2.04	2.04	1.94
Davenport	2.14	2.14	2.04
Detroit	1.95	1.95	1.95
Duluth	2.04	2.04	1.84
Indianapolis	1.99	1.99	1.89
Milwaukee	2.10	2.10	2.00
Minneapolis	2.27	2.27	2.02
Peoria	2.12	2.12	2.02
Pittsburgh	1.95	1.95	1.85
St. Paul	2.27	2.27	2.02
Toledo	2.10	2.10	2.03

Current mill-prices per barrel, in carloads, without bags, f.o.b.:

Alpena, Mich	$1.65	Limedale, Ind	$1.70
Buffington, Ind	1.70	Mason City, Ia	1.85
Clinchfield, Ga	2.10	Norfolk, Va	1.90
Hannibal, Mo	1.80	Northampton, Pa	1.75
Houston, Tex	1.95	North Birmingham, Ala	1.70
Hudson, N. Y	1.85	Richard City, Tenn	2.05
Ironton, Ohio	1.75	Steelton, Minn	1.85
Iola, Kan	1.85	Universal, Pa	1.70
La Salle, Ill	1.80	Wyandotte, Mich	1.70

SAND AND GRAVEL—Per ton, delivered by dealers. Weight of sand per cu.yd., 1½ tons; gravel, 1½ tons, unless otherwise specified in pounds:

	Gravel		Sand
	1½ In.	¾ In.	
Atlanta	**$3.25**	**$3.25**	**$2.50**
Baltimore, per cu.yd	2.40	2.60	1.70
Birmingham, per cu.yd., 2,600 lb	3.50	3.50	3.00
Boston	1.75	1.75	1.15
Chicago, per cu.yd	2.00	2.00	2.00
Cincinnati	1.75	1.75	1.50
Cleveland, per cu.yd., 3,000 lb	2.60	2.60	2.50
Dallas, per cu.yd., 2,700 lb	3.00	3.00	3.00
Denver, per cu.yd., 2,700 lb	1.95	1.95	1.35
Detroit	2.50	1.85	1.65
Kansas City	2.00	2.00	2.00
Los Angeles	1.40	1.40	1.00
Minneapolis, per cu.yd., 2,800 lb	2.40	2.40	1.10
Montreal	1.25	1.25	1.25
New Orleans, per cu.yd., 2,700 lb	3.75	3.75	2.75
New York, per cu.yd	3.40	3.40	2.15
Philadelphia	2.30@3.15	2.30@3.15	1.50@2.31
Pittsburgh	1.45@2.40	1.45@2.40	1.65@2.60
St. Louis	1.55	*1.40*	*1.30*
San Francisco	1.75	1.75	1.75
Seattle, per cu.yd., 3,200 lb	1.75	1.75	1.75

Note: New York gravel weighs 2,800@3,000 lb. and sand, 2,700 lb. per cu.yd.

CRUSHED STONE—Per ton, delivered by dealers. Weight per cu.yd., 1½ tons, unless otherwise specified in pounds:

	1½ In.	¾ In.
Atlanta	**$3.25**	**$3.25**
Baltimore, per cu.yd	2.75	2.85
Birmingham, limestone, per cu.yd	3.00	3.25
Boston	2.00	2.00
Chicago, limestone, per cu.yd., 2,500 lb	2.00	2.00
Cincinnati	2.25	2.25
Cleveland	2.60	2.60
Dallas, per cu.yd., 2,500 lb	3.25	3.40
Denver, granite, per cu.yd., 2,700 lb	2.50	2.50
Detroit, limestone	2.25	2.25
Kansas City	2.00	2.00
Los Angeles	1.50	1.50
Minneapolis, limestone, per cu.yd., 2,600 lb	2.40	2.40
Montreal	1.90	2.10
New York, limestone, per cu.yd	3.40	3.40
Philadelphia, limestone	2.30@3.15	2.30@3.15
Pittsburgh	2.75	2.75
St. Louis	*1.60*	*1.60*
San Francisco, trap rock	1.65	1.65
Seattle, per cu.yd., 2,700 lb	3.00	3.00

CRUSHED SLAG—Manufacturers' quotation on crushed slag in carloads, per net ton, at plant:

	1½-In.	¾-In.	Roofing	Sand
Birmingham, Ala	$0.90	$1.15	$2.05	$0.55
Buffalo District	1.25	1.35	2.25	1.25
Cleveland, Ohio	1.10	1.10	....	1.30
Western Pennsylvania	1.25	1.25	2.00	1.25
Toledo, Ohio	1.25	1.25	1.50	1.25
Youngstown District	1.25	1.35	2.00	1.25

HOLLOW TILE—Building tile per block, delivered by dealers to contractor in lots of 2,000 pieces or over:

	4x12x12	6x12x12	8x12x12	10x12x12	12x12x12
Atlanta	**$0.14**	**$0.18**	**$0.24**	**$0.30**	**$0.36**
Baltimore	.105	.....	.20	.....	.26
Birmingham	.09	.127	.174	.218	.261
Boston	.08	.113	.155	.21	*.255*
Chicago	.064	.088	.12	.1548	.172
Cincinnati	.06815	.09485	.129	.165	.184
Cleveland	.064	.088	.128	.171	.19
Dallas	*.085*	**.124**	**.194**	.251	.....
Denver	.0975	.135	.175	.2125	.25
Detroit	.098	.135	.184	.24	.265
Kansas City	.0525	.077	.184	.24	.265
Los Angeles	.085	.122	.175	.232	.285
Minneapolis	.0611	.081	.10605	.1302	.1737
Montreal	.12*	.....	.22†	.....	.....
New Orleans	.086	.118	.16	.212	.256
New York	.0864	.1296	.162	.....	.....
Perth Amboy, N. J. (f.o.b.)	.....	.....	.....	.2388	.2956
Philadelphia	.105	.14	.215	.28	.34
Pittsburgh	.068	.....	.1175	.....	.1726
St. Louis	.078	.104	.145	.175	.21
San Francisco	.108	.156	.255	.....	.....
Seattle	.085	.115	.18	.....	.....

*4x4x12. †8x8x12.

BRICK—Prices delivered by dealers per thousand, are as follows:

		Paving F.O.B.	
	Common	3x8¼x4-In.	3¼x8¼x4-In.
Atlanta	**$16.25**	**$36.00***	**$42.00†**
Baltimore	13.00	40.00	46.00
Birmingham	13.50	26.00*	31.00†
Boston	16.00	43.00	47.00
Chicago	12.00	42.00	45.00
Cincinnati	17.50	37.00	39.00
Cleveland	*12@14*	33.00	36.00
Dallas	*14.00*	*28.50**	.....
Denver	11.00	.....	.....
Detroit	15.50	33.50	36.50
Kansas City	14.00	.....	.....
Los Angeles	10.00	.....	.....
Minneapolis	12.75	.....	.....
Montreal	20.00	.....	.....
New Orleans	16.50	38.00*	45.00
New York	13.00	45.00	50.00
Philadelphia	16.00	40.00	46.00
Pittsburgh	16.00	40.50	45.00
St. Louis	*12@13*	**42.00**	**42.00**
San Francisco	*12.00*	45.00*	.....
Seattle	14.00	48.50**	61.00††

*2¼x8¼x4 in. †3x8¼x4. **2¼x8¼x4. ††3¼x8¼x4.

LIME—Prices delivered by dealers to job:

	Hydrated, per Ton		Lump, per Barrel	
	Finishing	Common	Finishing	Common
Atlanta	**$23.00**	**$15.50**	.....	.....
Baltimore	22.00	14.00	$2.55†	.....
Birmingham	22.00	16.00	3.00†	$2.00†
Boston	22.00	15.00	4.00*	3.15*
Chicago	17.00	14.50	15.00‡	15.00‡
Cincinnati	15.80	13.00	.....	.....
Cleveland	18.00	14.00	2.50†	2.50†
Dallas	20.00	.....	.....	18.00‡
Denver	32.00	23.75	3.80*	3.00*
Detroit	18.00	14.80	2.20†	2.00†
Kansas City	22.00	17.00	2.85†	2.25†
Los Angeles	18.90	16.00	2.85†	14.00‡
Minneapolis	25.50	21.00	.....	1.70†
Montreal	19.75	.....	.....	15.00‡
New Orleans	.....	.....	2.60†	1.60†
New York	21.00	13.00	4.10*	3.15*
Philadelphia	22.00	15.00	.....	.....
Pittsburgh	20.00	17.00	2.50†	.....
St. Louis	24.00	18.00	2.75†	15.00‡
San Francisco	20.00	20.00	.....	1.85†
Seattle, paper sacks	35.00	24.00	.....	2.80†

*Per 280-lb. bbl. (net). †Per 180-lb. (net). ‡Per ton.

CONCRETE BLOCKS—Manufacturers' quotations on standard, 8x8x16-in., hollow, delivered to job, each:

Boston	$0.18@$0.20	Minneapolis	$0.11
Brooklyn and Queens	.12@ .14	New Orleans	.22
Cleveland	.16@ .17	Philadelphia	.18@.25
Denver	.22	Pittsburgh	*.18*
Detroit	.15	St. Louis	.17
Kansas City	.18		

SLATE—Roofing, f.o.b., quarry, Bangor, Pa., net, per square:

No. 1 Clear	$9.00@$14.00
No. 1 Ribbon	7.50@ 10.25
Medium Clear	8.00@ 10.50

Road and Paving Materials

PAVING STONE—Carloads or cargo lots of granite blocks, 4x8x4-in., dressed, f.o.b.:

Atlanta	$3.00 per sq.yd.
Baltimore	3.00 per sq.yd.
Boston	135.00 per M.
Chicago, 5 in	3.25@3.90 per sq.yd.
Cincinnati	110.00 per M.
Cleveland	115@120 per M.
Detroit, 5 in	3.00 per sq.yd.
Kansas City	3.00 per sq.yd.
Minneapolis, 4½x8x5 in	2.80 per sq.yd.
Montreal	104.75 per M.
New Orleans	2.80 per sq.yd.
New York, 5 in., Grade 1, 30 blocks per sq.yd	150.00 per M.
Philadelphia	125.00 per M.
St. Louis, 4x5x8 to 12 in	3.50 per sq.yd.

Current Prices of Construction Materials

Road and Paving Materials—Continued

WOOD-BLOCK PAVING—Prices, f.o.b., in carloads:

	Size of Block	Treatment	Per Sq.Yd.
Atlanta	3½	16	$2.25
Boston	3½	16	2.25
Chicago	3½	12	2.10
Cincinnati	3½	16	2.35
Kansas City	3½	16	2.75
Minneapolis	3½	16	2.75
Montreal	4	16	4.50
New Orleans	3½	16	2.40
New York	3½	16	2.50
St. Louis	3½	16	2.40

FLAGGING—Alongside dock, New York: Manhattan and Bronx, 4 ft. wide, 24c. per sq.ft.; Queens, 5 ft. wide, 26c. per sq.ft.

CURBING—*New York*: Bluestone, f.o.b. barge, 5x16 in., rough, 90c. per lin.ft., cutting charges extra. *Birmingham*: Limestone, 5x18-in., f.o.b., $1.05 per lin.ft. *St. Louis*: Class "B" straight, 5x16-in., f.o.b., $1.00 per lin.ft.; roundings, $1.35 per lin.ft.

ASPHALT—Manufacturers' quotations per ton in packages (350-lb. bbls. or 425-lb. drums); also in tank-car lots, f.o.b. points listed:

	Package	Tank-car
Atlanta (Mexican)	$20.40	$17.40
Baltimore (Standard Oil, f.o.b. refinery)	21.75	17.75
Birmingham (Mexican)	27.00	23.00
Boston (Mexican)	23.50	18.00
Chicago (Texas)	23.50	19.30
Cincinnati (Kentucky Rock)	.....	12.30
Cleveland	24.00	20.00
Dallas (Texas)	24.40	21.00
Denver (California)	35.00	.....
Detroit (Mexican) (Texas)	19.72	14.87
Kansas City, Mo. (Texas)	21.30	17.00
Los Angeles ("D" Grade, Calif., f.o.b., El Segundo)	18.00	12.00
Maurer, N. J. (Bermudez)	30.00	.....
Maurer, N. J. (Trinidad)	25.00	.....
Minneapolis, (Stanolind, f.o.b., Twin Cities)	23.00	19.10
Montreal (Imperial)	28.00	21.50
New Orleans (Texas)	24.00	21.00
New York (Texas)	22.50	18.50
Philadelphia (Mexican)	18.00	15.00
Pittsburgh (Standard Oil)	24@26	14@18
St. Louis (Venezuelan)	22.50	18.50
San Francisco, (f.o.b. refinery, Oleum, Calif.)	18.00	12.00
Seattle (Standard Oil)	21.40	18.00

ROAD OILS—Manufacturers' quotations, f.o.b., in tank cars, 8,000 gal. minimum, per gal.:

Birmingham, 40@50% asphalt	$0.0525
Birmingham, 50@60% asphalt	.0525
Dallas, 40@50% asphalt	.07
Dallas, 50@60% asphalt	.07
New York, 40@50% asphalt, (at terminal)	.05
New York, 50@60% asphalt, (at terminal)	.05
St. Louis, 40@50% asphalt	.04
St. Louis, 50@60% asphalt	.04

Iron and Steel

PIG IRON—Producers' quotations, per gross ton, f.o.b.:

Birmingham, No. 2 fdry., silicon 1.75@2.25	$14.00
Pittsburgh, basic, incl. freight ($1.76) from Valley	19.63@20.13

STRUCTURAL STEEL—Manufacturers' and dealers' quotations per 100 lb.

	Shapes, 3 to 15-In.	Plates, ¼-In.
Birmingham, large mill lots, f.o.b.	$2.15	$2.15
Chicago, warehouse, delivered	3.00	3.00
Cleveland, warehouse, delivered	3.00	3.00
Dallas, warehouse, delivered	3.75	3.75
New York, warehouse, delivered, up to 3,999 lb.	3.10	3.10
Pittsburgh, large mill lots, f.o.b.	1.60	1.60
St. Louis, warehouse, delivered	3.25	3.25
San Francisco, warehouse, delivered	3.40	3.40

BARS, CONCRETE REINFORCING—Manufacturers' and dealers' quotations on bars rolled from billets, per 100 lb. for ½-in.:

Birmingham, large mill lots, f.o.b.	$2.15
Chicago warehouse, delivered	2.15@3.00
Cleveland, warehouse, delivered	2.25@2.44
Dallas, warehouse, delivered	2.78
New York, warehouse, delivered, over 5 tons	2.70
Pittsburgh, large mill lots, stock lengths, f.o.b.	1.70
St. Louis, warehouse, delivered	3.15
San Francisco, warehouse, delivered	2.50

EXPANDED METAL LATH—Per 100 sq.yd., painted, delivered to job, in less-than-carload lots:

Lb. per Sq.Yd.	New York	Birmingham	Chicago	St. Louis	Dallas	San Francisco
2.2	$18.50	$22.00	$10.10	$20.50	$21.50	$21.50
2.5	19.50	23.00	10.90	21.50	24.00	22.50
3.0	21.00	25.00	12.25	23.00	25.50	25.00
3.4	22.00	26.50	13.10	24.00	30.00	27.00

WIRE REINFORCEMENT FOR CONCRETE—Manufacturers' quotations per 100 sq.ft. in carloads at mills; dealers, delivered', in lots of 10,000 sq.ft. or over; plain 4 in. by 4 in. mesh:

Style Number	Weight in Pounds per 100 sq.ft.	Pittsburgh Mill	Chicago District Mill	Warehouse Delivery: New York	St. Louis	Dallas	San Francisco
032	22	$0.99	$1.01	$1.39	$1.30	$1.13	$1.22
049	28	1.26	1.29	1.76	1.70	1.38	1.55
068	35	1.54	1.58	2.18	2.10	1.67	1.91
093	40	1.98	2.03	2.79	2.65	2.00	2.46
126	57	2.45	2.51	3.45	3.30	2.55	3.03
153	68	2.92	2.99	4.13	4.00	3.16	.....
180	78	3.35	3.43	4.73	4.60	3.47	.....

STEEL SHEETS—Manufacturers' and dealers' quotations per 100 lb. base:

	Blue Annealed No. 10*	Black No. 24	Galvanized No. 24
Chicago, warehouse, delivered	$3.35†	$3.80†	$4.35†
Cleveland, warehouse, delivered	3.00	3.60	4.35
New York, warehouse, delivered	3.40	3.90	4.25
Pittsburgh, large mill lots, f.o.b.	1.90@2.00	2.45@2.55	3.10
St. Louis, warehouse, delivered	3.45	3.95	4.60
San Francisco, warehouse, delivered	3.80	4.35	4.85

*Light plates. †400 lb. to 3,999 lb.

WIRE ROPE—Discounts from manufacturers' list price on regular grades of bright and galvanized, Eastern Territory, New York, and East of Missouri River.

	Base
Cast steel round strand rope	20%
Galvanized iron rigging and guy rope (add to list)	12½%
Galvanized steel rigging and guy rope	7½%
Plow steel round strand rope	35%
Round strand iron and iron tiller	5%
"Special Steel" and extra strong cast steel, round strand rope	27½%

Discount 5 points less than discount for Eastern territory: California, Oregon, Nevada, Washington, Wyoming, New Mexico, Colorado, North Dakota, Nebraska, Kansas, Oklahoma and Texas. Discount 10 points less than discount for Eastern territory: Arizona, Montana, Idaho and Utah.

RIVETS—Manufacturers' and dealers' quotations on structural rivets, round head, ½-in., full kegs, per 100 lb.:

Chicago, warehouse, delivered	$4.00
Dallas, warehouse, delivered	4.50
Denver	4.80
New York, warehouse, delivered	4.50*
Pittsburgh, large mill lots, f.o.b.	3.75
St. Louis, warehouse, delivered	4.15
San Francisco, warehouse, delivered	5.50
Seattle, warehouse, delivered	4.25

*This price is for full kegs; broken kegs are $6.00 per 100 lb.

STEEL SHEETPILING—The manufacturers' base price, f.o.b., Pittsburgh, for large mill lots is $2.25 per 100 lb.

TERNE PLATE—I C, 8-lb. coating, 20x28-in., f.o.b., Pittsburgh mill:

Per package	$10.30

SHIP SPIKES—Per 100 lb., black, from dealers' warehouse stocks; galvanized are about $1.75 per 100 lb. higher:

	⅜-In.	½-In.	⅝-In.
San Francisco	$5.55	$5.10	$4.95
Seattle	7.75	5.65	5.50

Pittsburgh mill base in lots of 200 kegs or more, $3.00 per 100 lb.

WIRE NAILS—Per 100 lb. keg, base, delivered from warehouse stocks; also Pittsburgh mill base:

Pittsburgh Mill	Birmingham	Chicago	St. Louis	Dallas	San Francisco	Montreal
$2.05	$3.30	$3.30	$2.65	$3.75	$3.25	$4.95

SCRAP—The prices following are, f.o.b., per ton, paid by dealers:

	New York Per Gross Ton	Chicago Per Gross Ton	Detroit Per Gross Ton
No. 1 railroad wrought	$9.75	$11.25@$11.75	
Stove plate	6.00	9.00@ 9.50	$8.00*
No. 1 machinery cast	9.50	12.00@ 12.50	9.50*
Machine shop turnings	5.00	5.75@ 6.25	6.00
Cast borings	4.50	7.50@ 8.00	6.50
Railroad malleable	10.50	13.50@ 14.00	12.00
Re-rolling rails	9.50	14.50@ 15.00	13.00
Re-laying rails, 56@60 lb.	23.00	23.00@ 25.00	.....
Heavy melting steel, No. 1	9.00	12.00@ 12.50	11.25
Iron and steel pipe	7.50	7.00@ 7.50	.....

*Net ton.

FREIGHT RATES—Effective May 20, 1930, on finished steel products in the Pittsburgh district, including plates, structural shapes, merchant-steel bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished) chains, etc., the following freight rates in cents per 100 lb., apply on carload lots of 36,000 lb. or 18 tons:

Atlanta	$0.58	Detroit	$0.265
Baltimore	.27	Kansas City	.71†
Birmingham	.58	New Orleans	.67
Boston	.40	New York	.33
Buffalo	.235	Pacific Coast (all rail)	1.15*
Chicago	.34	Philadelphia	.29
Cincinnati	.265	St. Louis	.39
Cleveland	.185	St. Paul	.60
Denver	1.15*		

*Minimum weight on structurals, 60,000 lb. †Except iron or steel pipe and fittings.

Railway Materials and Supplies

STEEL RAILS—Manufacturers' quotations per gross ton, f.o.b., for large mill lots:

	Pittsburgh	Birmingham	Chicago
Standard openhearth rails	$43.00	$43.00	$43.00
Light rails, 25 to 45 lb.	34.00	34@36	34@36
Re-rolled rails	32.00	34@36	34@36

RAILWAY TIES—For fair-sized orders, f.o.b., the following prices per tie hold:

		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
New York	Long-leaf sap pine, untreated	$1.05	$1.20
	Creosoted—prices on application.		
Birmingham	White oak, creosoted	1.52	1.75
	Southern pine, creosoted	1.25	1.60
	White oak, untreated	1.35	1.70
Chicago	Oak, empty cell, creosoted	1.75	2.30
	Oak, zinc treated	1.55	2.05
	Southern pine, creosoted	1.45	1.90
	White oak, untreated	1.00	1.45
St. Louis	Red oak, creosoted	1.30	1.85
	Sap pine or cypress, untreated	.65	1.10
San Francisco	Douglas fir, green, untreated	.68	.96
	Douglas fir, empty cell, creosoted	1.14	2.35
Montreal	Birch or maple, untreated	.75@1.25	.75@1.25
	Birch or maple, creosoted	1.20@1.30	1.50@1.60

Current Prices of Construction Materials

Railway Supplies—Continued

TRACK SUPPLIES—Manufacturers' and dealers' quotations per 100 lb. f.o.b., Pittsburgh mill, for large mill lots, together with warehouse prices at other places named:

	Pittsburgh	Chicago	Birmingham	St. Louis	San Francisco
Standard spikes, ⅝-in. and larger	$2.80	$3.55	$3.45	$3.65@$3.85	$4.10
Track bolts	3.80	4.55	5.85	4.65@ 4.85	5.10
Standard section angle bars, splice bars or fish plates	2.75	3.40	3.75	.....	.....

Tie plates: Price at Pittsburgh mill, $2.07½ per 100 lb.

Pipe

WROUGHT-STEEL PIPE—Discounts from manufacturers' and dealers' standard lists:

	1 to 3-In. Butt Weld		3½ to 6-In. Lap Weld	
	Black	Galvanized	Black	Galvanized
Chicago, warehouse, delivered	57.3%	44.8%	53.9%	41.4%
Cleveland, warehouse, delivered	53.3%	42.3%	50.8%	37.8%
New York, warehouse, delivered	56.14%	43.6%	52.72%	40.18%
Pittsburgh, large mill lots, f.o.b.	64%	52.5%	61%	49.5%
St. Louis, warehouse, delivered	51%	38%	48%	35%

CAST-IRON PIPE—Prices of U. S. Pipe & Foundry Co., per net ton, for bell and spigot pipe, Class B and heavier, f.o.b., on regular lots of pipe:

	4-In.	6-In. and Over
Birmingham mill	$40.00@$41.00	$37.00@$38.00
Burlington (N. J.) mill	40.00	37.00
Chicago	48.20@ 49.20	45.20@ 46.20
New York	42.90	39.90
Pittsburgh	48.80@ 49.80	45.80@ 46.80
St. Louis	48.00	45.00
San Francisco	50.00@ 51.00	47.00@ 48.00

Gas pipe and Class A, $3.00 per ton extra.

SEWER PIPE—Prices delivered, per foot, for standard pipe; 6, 8 and 12-in. are single strength and 18, 24, 30 and 36-in. are double strength:

	6-In.	8-In.	12-In.	18-In.	24-In.	30-In.	36-In.
Atlanta	$0.22	$0.37½	$0.82½	.....	.....	.....	.....
Baltimore	.10	.30	.58	.....	$1.93	.....	$6.50
Birmingham	.25	.40	.65	$1.50	2.75	$3.90	5.85
Boston	.18	.30	.55	1.35	2.25	3.70	6.50
Chicago	.18	.28	.54	1.25	2.25	4.75	6.00
Cincinnati	.135	.21	.405	1.05	1.89	3.456	5.4325
Cleveland	.189	.294	.567	1.35	2.43	4.824	7.38
Dallas	.25	.375	.68	1.60	*2.65*	.....	.....
Denver	.161	.23	.414	.816	1.44	.....	.....
Detroit	.18	.28	.6075	1.50	2.70	5.12	7.91
Kansas City	.21	.29	.51	.....	1.90	3.80	.....
Los Angeles	.21	.29	.52	1.186	2.03	3.39	5.09
Minneapolis	.16	.25	.50	1.15	1.85	3.49	4.97
Montreal	.36	.53	.78	1.48	2.75	4.20	.....
New Orleans	.195	.325	.585	1.10	2.11	.....	.....
New York	.17	.265	.52	1.30	2.34	4.47	6.86
Philadelphia	.117	.182	.351	1.05	1.89	3.60	5.6375
Pittsburgh	.0945	.147	.2385	.85	1.53	3.024	4.8175
St. Louis	.1645	.26	.468	1.092	1.872	3.65	4.80
San Francisco	.1925	.275	.495	1.155	1.98	3.30	4.95
Seattle	.22	.30	.54	1.26	2.16	3.50	5.50

CLAY DRAIN TILE—Prices delivered by dealers, per 1,000 lin.ft.:

Size, In.	New York	Birm'ham	St. Louis	Dallas	San Fran.	Seattle
4	$55.00	$56.00	$50.00	$63.00	$67.50	$60.00
6	112.00	112.00	85.00	100.00	112.50	112.00

Miscellaneous

LINSEED OIL—Raw oil, f.o.b., in 1- to 4-bbl. lots, per lb.:
New York.... *$0.10¼* Chicago.... *$0.11* Minneapolis... *$0.115*

WHITE AND RED LEAD—Base price per 100-lb. keg, f.o.b., New York: White, dry, $13.75; White, in oil, $13.75; Red, dry, $13.75; Red, in oil, $15.25.

CHEMICALS—Water, sewage treatment, road work, round lots in the New York market:

Sulphate of aluminum, in bags, per 100 lb	$1.40@$1.45
Sulphate of copper, in bbl., per 100 lb	*4.25@ 4.50*
Soda ash, 58%, in bags, per 100 lb	1.32@ 1.35
Chlorine, cylinders, per lb	.04@ .06
Bleaching powder, in drums, f.o.b. works, per 100 lb	2.00@ 2.10
Calcium chloride, flaked, in drums, f.o.b. works, per ton	22.75

MANILA ROPE—The number of feet per pound for the various sizes is as follows: ⅝-in., 7-ft., 6-in.; ¾-in., 6-ft., 1-in.; ⅞-in., 4-ft., 5-in.; 1-in., 3-ft., 8-in.; 1¼-in., 2-ft., 5-in.; 1½-in., 1-ft., 8-in. Following prices are quoted by dealers per pound for ¾-in. and larger:

Atlanta	$0.35	Kansas City	$0.29
Baltimore	.225	Los Angeles	.25
Birmingham	.26	Minneapolis	.21
Boston	.215	Montreal	.185
Chicago	.19	New Orleans	.25
Cincinnati	.21	New York	.205
Cleveland	.21	Philadelphia	.23
Dallas	.20	San Francisco	.195
Denver	.22	Seattle	.195
Detroit	.23	St. Louis	*.19@.22*

BUILDING PAPER—Black, 50-lb., in carloads, per roll of 500 sq.ft., f.o.b., producing point $2.00

SLATERS FELT—In carloads, per roll, f.o.b., producing point $0.70

ROOFING MATERIALS—Price f.o.b., New York, delivered by dealers to contractors in carloads:

Asphalt felt, per 100 lb	$3.00
Tar felt, per 100 lb	3.00
Asphalt coating, per gal	.34½
Tar pitch, in 350 lb. barrels, per ton	28.00

PREPARED ROOFINGS—Prices delivered by dealers to contractors, in each load, f.o.b. New York, per square:

Single shingles, slate finish, sufficient to cover 100 sq.ft.	$6.12
Strip shingles, 4 in 1, hexagonal shape, with Underwriters' label	6.00
Slate surfaced roofing in rolls weighing 85 to 90 lbs.	2.50

WINDOW GLASS—United inches 25, bracket size 6x8 to 10x15, single or double thickness, discount from jobbers' list (Sept. 15, 1928), at New York warehouses:
AA..... 83% A..... 86% B..... 88%

EXPLOSIVES—Manufacturers' quotations per pound for dynamite delivered in small lots, under 200 lb.:

	Gelatin 40%	Gelatin 60%		Gelatin 40%	Gelatin 60%
Atlanta	$0.22	$0.245	Los Angeles, f.o.b.†	$0.1875	$0.2225
Baltimore	.215	.2375	Minneapolis	.2225	.2450
Birmingham	.22	.245	Montreal	.20	.24
Boston	.225	.255	New Orleans	.195	.22
Chicago	.195*	.22*	New York	.255‡	.2775‡
Cincinnati	.22	.245	Philadelphia	.215	.24
Dallas	.20	*.2475*	St. Louis	.215	.235
Denver, f.o.b.	.19	.2125	San Francisco	.155	.18
Kansas City, Mo.	.2025	.2225	Seattle	.1525	.175

*Quantities above 500 lb. but less than a ton. †San Fernando Arsenal. ‡Special gelatin in case lots.

Lumber

Prices Are Per Thousand Feet, Board Measure

New York—Timbers, No. 1 Common, rough, delivered in Manhattan to contractor at site of job, in 20 ft. lengths and under, per M. ft., b.m.:

	Long-leaf Yellow Pine	Douglas Fir
3x4 to 8x8	$50.00	*$35.00*
3x10 to 10x10	60.00	*36.00*
3x12 to 12x12	70.00	*37.00*
3x14 to 14x14	80.00	*42.50*

Chicago—Prices, f.o.b., in carloads, No. 1 Common, rough, per M. ft. b.m. For delivery to job from stock, in truckloads, add $10 per M. ft., b.m.:

	20 Ft. and Under Long-Leaf Yellow Pine	Up to 32 Ft. Douglas Fir
3x4 to 8x8	*$41.50*	$39.50
3x10 to 10x10	*49.00*	39.50
3x12 to 12x12	*61.00*	39.50
3x14 to 14x14	*73.00*	40.50

San Francisco—Douglas fir, No. 1 common, rough, at yards. For delivery to contractor at site of job, add $1.50 to $5 per M. ft., b.m.:

	10-16-18 and 20 Ft.	22 and 24 Ft.
3x3 and 4	$30.00	$32.00
3x6 and 8	30.00	32.00
3x10 and 12	30.00	32.00
3x14	33.00	34.00

Other Cities—Delivered by dealers, No. 1 Common, rough, per M. ft., b.m.:

	8x8-In. x 20 Ft. and Under				3x12 to 12x12-In. 20 Ft. and Under	
	Pine	Fir	Hemlock	Spruce	Pine	Fir
Atlanta	$55.00	.....	.....	.....	$65.00	.....
Baltimore	36.00	$50.00	$53.50	$61.00	.00	$50.25
Birmingham	53.00	.....	.....	.....	.50	.....
Boston	*52.00*	45.00	47.00	48.00	*59.00*	40.00
Cincinnati	*42.50*	*55.00*	.....	.....	*52.50*	52.50
Cleveland	58.00	58.00	.....	.....	58.00	58.00
Dallas	55.00	55.00	52.50	55.00	55.00	**55.00**
Denver	.....	50.00	47.50	47.50	.....	55.00
Detroit	53.00	51.00	.....	.....	67.00	51.00
Kansas City	38.50	46.50	.....	.....	52.50	54.50
Los Angeles	.....	41.50	.....	.....	.....	41.50
Minneapolis	.....	46.25	.....	.....	.....	46.25@47.75
Montreal	50.00	48.00	.....	.....	56.00	48.00
New Orleans	52.00	48.00	.....	44.00	67.00	65.00
Philadelphia	50.00	43.00	42.00	48.00	60.00	43.00
Pittsburgh	65.00	70.00	75.00	65.00	65.00	65@72
St. Louis	*45.00*	*41.00*	*40.00*	.....	*58.00*	*42.00*
Seattle	.....	**21.00**	.....	.....	.....	**20@21**

	1x10 In. x 16 Ft. and Under			2x10 In. x 16 Ft. T. & Gr.	
	Pine	Fir	Hemlock	Pine	Fir
Atlanta	*$55.00*	.....	.....	*$40.00*	.....
Baltimore	55.00	$44.50	$44.00	.....	.....
Birmingham	36.00	.....	.....	45.00	.....
Boston	*46.00*	40.00	42.00	*48.00*	$45.00
Cincinnati	*45.00*	*47.50*	.....	*35.00*	*45.00*
Cleveland	60.00	48.00	.....	45.00	58.00
Dallas	60.00	.....	.....	55.00	.....
Denver	.....	38.00	38.50	.....	44.00
Detroit	48.00	44.00	.....	48.50	46.50
Kansas City	48.50	35.50	.....	38.50	37.75
Los Angeles	.....	38.50	.....	.....	53.50
Minneapolis	65.00*	40.00	.....	45.00*	39.00
Montreal	56.00	.....	.....	.....	.....
New Orleans	49.00	49.00	.....	59.00	55.00
Philadelphia	52.00	43.00	41.00	55.00	44.00
Pittsburgh	50.00	60.00	59.00	42.00	.....
St. Louis	*45.00*	*42.00*	*41.00*	*45.50*	*44.00*
Seattle	.....	18.00	.....	.....	*18.00*

*Northern Pine, No. 2 Com.

PILES—Prices of Nichols Bros., 90 West St., N.Y.C., per lineal foot, pine, with bark on, f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Barge	Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.14½	$0.18
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.19	.23
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.21½	.25
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.25½	.36
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.27½	.31
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.33	.41
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.38	.45

Unit Prices From Current Construction Bids

Monolithic Storm Sewer for Newark

REINFORCED-CONCRETE storm sewers will carry the waters of Meadow Brook, now an open stream, for 6,500 ft. through the developed and undeveloped areas between Bloomfield Ave. and the Morris Canal, in Newark, N. J. The principal sections total 5,516 ft. of 9½- to 12-ft. semi-elliptical pipe, with 5 to 18 ft. cover, and bids were asked for monolithic and precast. Monolithic was selected, as prices were 15 per cent lower. In addition to this conduit, changes and additions to the sanitary sewer system in this vicinity will be made and connected to the 30-in. supplementary union outlet sewer which discharges into the Passaic Valley intercepting sewer.

Construction has been divided into two sections to expedite the work: I, from Morris Canal to Eugene Place, $261,890; II, to Bloomfield Ave., $192,257. Mahlon Averill, 222 Clinton Ave., Newark, is the contractor on both sections. James W. Costello is chief engineer, department of public works. The sewer was designed by Edward S. Rankin, division engineer.

DIMENSIONS OF THE THREE SECTIONS

	12-Ft.	11-Ft.	9½-Ft.
a	15	13½	11'10½"
b	1½	1'4½"	1'2¼"
c	12	11	9½
d	12	11	9½
e	2½	2½	1'11½"
f	4	3½	3½
g	15	13½	11'10½"
h	12½	11'5½"	9'10½"
i	15	13½	11'10½"
j	4	3½	3½
k	5	4'7"	3'11½"
l	1	11"	9½"

APPROXIMATE QUANTITIES

Size, Ft.	Length in Ft.	Sq.Ft. Area Concrete	Cu.Yd. Conc. Per Lin.Ft.	Lb. Steel Per Lin.Ft.
12.0	1,521	63.68	2.30	145.30
11.0	2,282	54.20	2.00	124.60
9.5	1,713	40.50	1.50	91.00

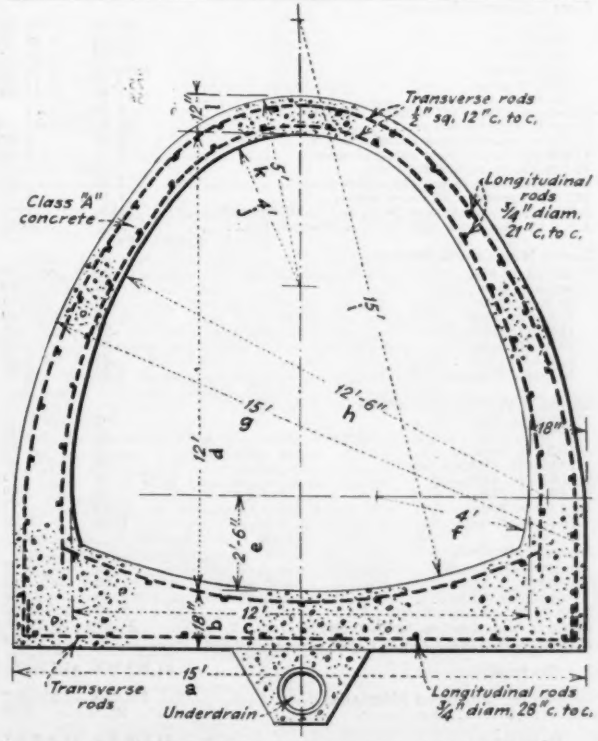


FIG. 1—TYPICAL CROSS-SECTION OF THE SEMI-ELLIPTICAL SEWER, NEWARK

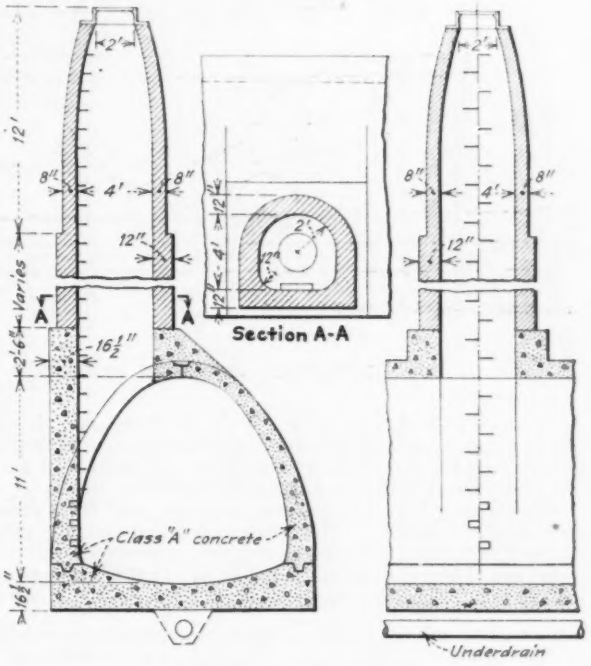


FIG. 2—TYPICAL MANHOLE SECTIONS

SECTION I

1,521 ft. 12-ft. rein-con. sewer	Contract Price
Alt. A, monolithic	$57.00
Alt. B, precast	67.00
2,282 ft. 11-ft. rein.-conc. sewer	
Alt. A, monolithic	54.35
Alt. B, precast	63.40
313 ft. 42-in. rein.-conc. pipe	
140 ft. 30-in. rein.-conc. pipe	
13 manholes over 12- and 11-ft. sewer	300.00
26 manholes over 42-, 30,- 21-ft. sewer	200.00

SECTION II

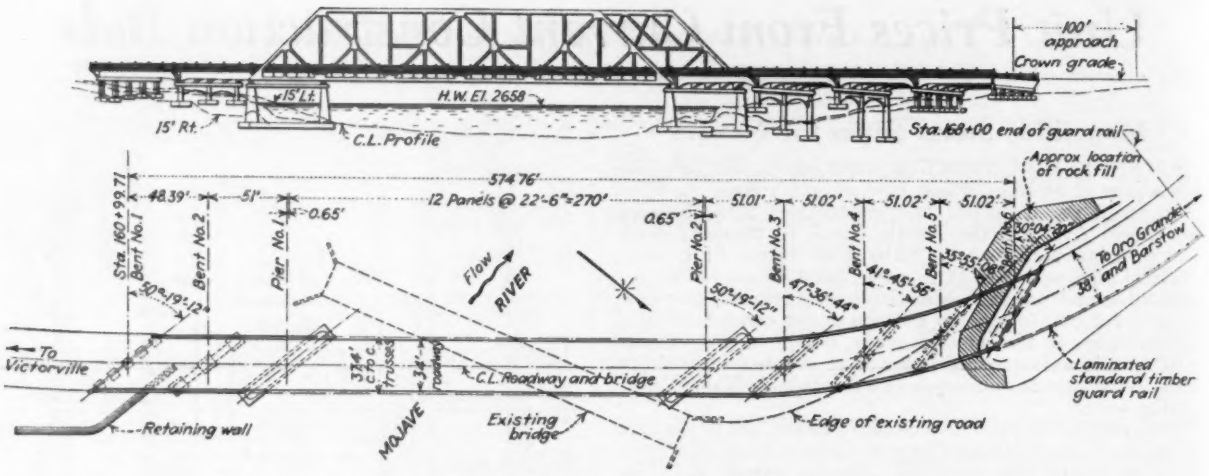
1,713 ft. 9½-ft. rein.-conc. sewer	
Alt. A, monolithic	55.00
Alt. B, precast	63.00
922 ft. 8½-ft. rein.-conc. pipe	38.00
392 ft. 6-ft. rein.-conc. pipe	24.90
501 ft. 5½-ft. rein.-conc. pipe	18.70
800 ft. 18-in. V.C.	2.90
50 ft. 15-in. V.C.	2.60
920 ft. 8-in. plain con.	2.25
14 manholes over 9½- and 8½- ft. sewer	200.00
6 manholes over 6- and 5½-ft. sewer	175.00
16 manholes over 21-, 18-, 15-, and 8-in.	150.00

SECTIONS I AND II

5,294 ft. 21-in. rein.-conc. pipe	3.40
1,000 ft. 6-in. c.-i. house connections	.80
400 ft. 4-in. c.-i. house connections	.70
8,756 ft. underdrain	.80
3,000 ft. b.m. foundation timber (sec. I)	60.00
2,000 ft. b.m. foundation timber (sec. II)	70.00
1,000 M. ft. b.m. sheathing	30.00
100 cu.yd. class A concrete (1, 2, 4)	27.00
300 cu-yd. class B concrete (1, 3, 5)	19.00
974 cu.yd. broken stone	5.00
4 basins with State Hy. heads and single inlets	160.00
250 markers at house connections	.50

Steel Highway Bridge in San Bernardino, Calif.

A HIGHWAY bridge is being constructed for $118,461 across the Mojave River in San Bernardino County, Calif., 3 miles north of Victorville, consisting of one 270-ft. through steel truss span, five 51-ft. concrete girder spans and one 48-ft. concrete girder span, on concrete piers and bents, as shown in the drawing. Clear width of roadway is



ELEVATION AND PLAN OF BRIDGE ACROSS MOJAVE RIVER IN CALIFORNIA

34 ft. and underclearance is 14½ ft. at high-water level. Work includes grading and oiling a detour, grading 80 lin.ft. of approach fill, constructing a concrete retaining wall and removing the existing steel bridge shown in the plan.

The existing bridge consists of a 250-ft. steel truss span on concrete abutments. The trusses are being carefully dismantled, matchmarked and stored for re-erection. Abutments are to be removed to ground level. In the lowest total bid the unit price for this work was $3,000, compared with

	A	B
5,900 cu.yd. roadway excav	$0.50	$0.40
50,000 sta.yd. overhaul	.01	.015
148 lin.ft. corr. metal pipe	1.00	1.00
350 lin.ft. laminated timber guard rail	1.00	1.20
Removing steel-truss bridge	3,000.00	6,000.00
1,400 cu.yd. structure excav	2.50	1.75
1,430 cu.yd. class A conc	16.50	16.00
400 cu.yd. class [illegible] conc	15.50	16.00
265 cu.yd. class C conc	14.50	16.00
260,000 lb. reinf. steel	.04	.045
750,000 lb. structural steel	.065	.067
12,900 lb. cast steel	.14	.14
6,220 lb. bronze exp. joints	.35	.50
19,200 lb. c.-i. rail	.10	.11
62,000 lb. structural steel in rail	.10	.11
870 cu.yd. riprap	2.00	5.00
	$118,461	$126,705

$2,500 and $2,750 for the next two and $5,100 for the average of the nine bids. Another item, for grading and oiling the 0.294-mile detour, varied from $5,145 to $1,205, and is omitted from the accompanying list of prices. Riprap to be used at the northwest end of the bridge is to be stockpiled within 300 ft. of the southeast end, and varies from 1 to 20 cu.ft. Corrugated metal pipe is furnished by the state. Concrete is classed according to the number of bags per cubic yard, as follows: A, 6; B, 5; C, 4.2. Class C may contain boulders not more than 14 in. in diameter and at least 6 in. apart.

Unit prices are given of the lowest two bidders: A, J .F. Knapp, Oakland (awarded), $118,461; B, Rocca & Caletti, San Rafael, $126,705. C. H. Purcell is state highway engineer. Bids were received April 23, 1930.

Outfall Sewer in Louisville, Ky.

SECTION A of the southern outfall, part of a new outfall to serve an extensive system of sewers in the southern portion of Louisville, Ky, was awarded as contract 47 on July 1, 1930, to the Pittsburgh Foundation Co., low bidder, at $1,749,364. This bid, one of seventeen, was only $5,038 below the second and 29.5 per cent below the average. Tabulation gives the contract unit prices and those of the second bidder, Torson Construction Co., Long Beach, Calif. W. M. Caye is technical engineer for the commissioners of sewerage of Louisville.

The outfall consists of 5,795 ft. of reinforced-concrete sewer 27½ ft. high by 18⅓ ft. wide and 4,269 ft. of 23½ ft. by 15⅔ ft. wide. Work will be in the right-of-way extending through Jefferson County, and includes an outlet structure 256 ft. long, extending 50 ft. into the Ohio River. Bids will be requested on the remainder of this outfall upon completion of the first section. The work is paid for from the proceeds of a $10,000,000 sewer issue voted Nov. 4, 1928.

Earth Excav. and Backfill		
520 cu.yd.	$10.00	$7.10
9,500 cu.yd.	3.00	2.00
4,284.00 lin.ft.	33.00	36.00
3,540.00 lin.ft.	33.50	41.00
2,270.39 lin.ft.	34.50	42.00
2,200 cu.yd. earth excav. and cleaning up	0.50	0.30
300 cu.yd. rock excav. and backfill (shale)	10.00	8.00
50 cu.yd. rock excav. and backfill (limestone)	12.00	12.50
Class A Concrete Masonry		
870 cu.yd.	30.00	15.00
2,000 cu.yd.	15.00	14.50
26,700 cu.yd.	10.00	10.33
52,770 cu.yd.	10.00	10.33
3,990 cu.yd.	11.00	12.00
660 cu.yd.	11.50	15.00
200 cu.yd. Class "C" concrete masonry	9.00	10.00
2 cu.yd. brick masonry	50.00	28.00
11,000 sq.yd. vit. brick lining of sewer	3.00	3.00
11,000 sq.yd. vit. plate lining of sewer	2.75	3.00
10,220,000 lb. reinforcing bars	.0325	.03
500 cu.yd. earth excav. below sewer	1.00	1.00
500 cu.yd gravel refill below sewer	1.50	1.50
A.S.T.M. clay sewer pipe 24-in. and smaller, $1,971.12	55%	55%
A.S.T.M. clay sewer pipe 27-in. and larger, $72	50%	50%
Laying With Cement Mortar		
200 lin.ft. 6-in.	.25	.25
30 lin.ft. 8-in.	.30	.30
30 lin.ft. 12-in.	.35	.35
272 lin.ft. 15-in.	.40	.40
174 lin.ft. 18-in.	.50	.05
10 lin.ft. 21-in.	.60	.60
52 lin.ft. 24-in.	.75	.75
10 lin.ft. 30-in.	1.00	1.00
Laying With Plastic Compound		
200 lin.ft. 6-in.	.45	.45
30 lin.ft. 8-in.	.50	.50
30 lin.ft. 12-in.	.55	.55
272 lin.ft. 15-in.	.60	.60
174 lin.ft. 18-in.	.70	.70
10 lin.ft. 21-in.	.80	.80
52 lin.ft. 24-in.	.95	.95
10 lin.ft. 30-in.	1.25	1.25
Laying Underdrain		
5,000 lin.ft. 8-in.	.50	.35
5,000 lin.ft. 10-in.	.60	.45
5,000 lin.ft. 12-in.	.70	.60
7,200 lin.ft. precast concrete piles	3.00	2.00
10,000 ft. b.m. sheeting, bracing, etc	25.00	25.00
150,000 lb. lead seal strips in joints	.30	.12
Net total	$1,724,363	$1,725,651
Progress and completion $50 per day	$25,000	$28,750
	500*	575*
Gross total	$1,749,363	$1,754,401

*Number of days.

CONSTRUCTION NEWS

Some of the Week's Large Projects

For further details turn to the appropriate sections in this issue

Location	Project	Cost	Status
Waterworks			
Memphis	Pumping station	$2,000,000	Proposed
Seattle	Pipe line, reservoir, etc.	2,700,000	Bids asked
Sewers			
Middletown (Conn.)	Sewage disposal plant	1,000,000	Proposed
Cleveland	Sewage disposal	12,000,000	Proposed
Bridges			
Indiana and Kentucky	Bridge	4,000,000	Bids asked
Cincinnati	Bridge	3,500,000	Bids asked
Excav., Dredging			
Berkeley (Calif.)	River front development	5,000,000	Proposed
New Jersey	Jetties and Bulkheads	1,500,000	Proposed
Power and Lighting			
Kentucky and Ohio	Power line, etc.	1,000,000	Owners forces
Sports and Parks			
Cleveland	Stadium	1,000,000	Bids asked
Unclassified			
Oklahoma and Kansas	Oil pipe line	1,000,000	Proposed
Factories and Mills			
Fitchburg (Mass.)	Factory	1,500,000	Contract
Duluth	Gas Plant	2,000,000	Contract
Houston	Refinery, etc.	2,000,000	Separate contracts
Buildings			
New York	Apartment	1,000,000	Separate contracts
Brooklyn	Church	1,000,000	Proposed
Springfield (Mass.)	Hospital	1,000,000	Proposed
New York	Hospital	1,000,000	Proposed
San Francisco	Office	2,000,000	Bids asked
Salt Lake City	Office	1,500,000	Proposed
Attica (N. Y.)	Prison	1,000,000	Proposed
Long Island City	Boro Hall and Court House	8,000,000	Proposed
New York	Armory	1,000,000	Proposed
Columbus (O.)	State Office	3,039,000	Contract
Oberlin (O.)	College	1,000,000	Contract
Aurora (Ill.)	Theatre	1,000,000	Proposed
Chicago	Theatre	1,500,000	Proposed
New York	Theatre	1,000,000	Proposed
St. Louis	Publishing	1,500,000	Bids asked
Chicago	Railroad Station	1,400,000	Contract
Maspeth (N. Y.)	Terminal	2,000,000	Proposed
Philadelphia	World's Trade Mart	2,000,000	Proposed

WATERWORKS

PROPOSED WORK

Calif., Daly City—Surveys 1 m.g. reservoir for Muny Water System. R. A. Klassen, Court House, Redwood City, engr.

Colo., Pueblo—Bd. Trustees Pueblo Waterworks, D. P. Porter, supt., 319 West 4th St., soon takes bids reservoir (probably take separate bids on excavating, concreting walls, basin and roof for basin). $75,000.

Ill., Western Springs—Village iron removal and water softening plant. $50,000. Alvord, Burdick & Howson, 20 North Wacker Dr., Chicago, engrs.

Ind., Jeffersonville—See "Contracts Awarded."

Ky., Louisville — Louisville Water Comn., wrecking 39 m.g.p.d. steel mechanical filters, replacing same with rein.-con. filters, retaining coagulation basins, filter houses, clear well. $200,000. J. Chambers, 435 South 3rd St., ch. engr. Alvord, Burdick & Howson, Hartford Bldg., Chicago, Ill., consult. engrs.

Mass., Shutesbury—Amherst Water Co., Amherst, extending waterworks, incl. pipe line, constructing 175 ft. dam, Atkins Pond, 213 acre reservoir, relocating Amherst-Shutesbury Hy. To exceed $15,000.

N. J., Trenton — City Comn. rejected bids Sept. 19, pump and electrical equipment for water pumping station. Will readvertise. Noted Sept. 11.

N. J., Trenton—New Jersey Water Co., Haddon Heights, new well to supply 1,000,000 gal. more water for Hudson Twp.

O., East Canton—Preliminary surveys drilling wells, creating water supply for district, erecting pumping station. $75,000. G. Davidson, Canton, engr.

Okla., Perry—Preliminary plans impounding reservoir. $100,000. Black & Veatch, Mutual Bldg., Kansas City, Mo., engrs. Noted Aug. 24.

Okla., Stigler—Preliminary plans water supply improvements, raising dam, new spillway. $15,000. J. L. Holmes, mayor.

Okla., Tipton—See "Contracts Awarded."

Pa., Hollidaysburg—Bd. Dirs. Blair Co. waterworks, incl. 2.5 mi. mains, small reservoir at intake end. $25,000. **Maturity probably end of year.** G. S. W. Brubaker, Hollidaysburg, engr.

Tenn., Memphis—Bd. Water Comrs. retained Fuller & McClintock, engrs., 170 Bway., New York, to make preliminary studies pumping station east of Normal State Teachers College, on campus, annexed territory. $2,000,000.

Tex., Big Spring—Waterworks improvements, incl. 7,100 lin. ft. 12 in., 47,800 ft. 6 in. c.i. pipe, 41,000 lb. lead, hydrants, fire plugs, etc. $75,000. Address V. R. Smithan, city mgr. Hawley & Freese, 303 Frost Bldg., San Antonio, engrs.

Tex., Dallas—A. B. Lee, 616 Grandview St., granted franchise water and sewer lines through University Park. $35,000.

BIDS ASKED

Calif., El Centre—Oct. 15, by J. C. Neale, city clk., 7,000 ft. 4 and 6 in. Class B bell and spigot, c.i. pipe, 12 or 16 ft. lengths.

Calif., Fullerton—Oct. 7, by F. C. Hazmalhalch, city clk., 14,780 ft. 6- to 12-in. c.i. water pipe, 21,550 lb. fittings, miscellaneous valves.

Calif., Stratford — Bd. Directors Stratford Public Utilities Dist., bids about Oct. 14, 30,000 gal. steel tank on tower, 1,200 ft. well pump motor, pipe lines. $28,000. J. B. Benedict, Hanford, engr.

Ill., Chicago—Oct. 7, by City, at office Bd. Local Impvts., City Hall, c.i. water supply pipes, castings, c.i. fire hydrants, valves, brick valve basins in West 60th, 61st, 63rd and 94th Sts., Hamlet, Highland, South Kolin, Lambert, Paxton, South Normandy, South Natoma, South Nashville, South Neenah, South Natchez, South Homan, South Turner, South Spaulding and South Sawyer Aves.; water service pipes in West 129th Pl., South Green and South Peoria Sts., North Nordica, Newport, North Mulligan and Paxton Aves. M. J. Faherty, pres.

Ind., Jeffersonville—See "Waterworks."

La., Marrero — Oct. 30, by East Jefferson Waterworks Dist. 2, furnishing, installing machinery for pumping station and waterworks plants; constructing 35 x 56 ft. brick pumping station with 1 story, 15 x 65 ft. wing, filter galleries, chemical house; distribution system. $300,000. J. F. Coleman Eng. Co., Hibernia Bldg., New Orleans, engrs.

Mich., Detroit—Oct. 7, by Bd. Water Comrs., L. P. Fisher, pres., filter operating tables in filtration plant, Springwells Station, West Warren Ave., Contr. FC-19.

Mo., Lemar — Oct. 7, by City, extending waterworks, incl. 277 cu.yd. rein.-con., 25,682 lb. reinforcing bars, 1,545 ft. 8 in. c.i. pipe, two 170 g.p.m. direct connected centrifugal pumps, one 500 and one 250 g.p.m. horizontal pumps, 250,000 g.p.d. filter unit, filter building, low service pump house. A. C. Moore, Joplin Natl. Bank Bldg., Joplin, engr. Noted Sept. 11.

N. Y., Brooklyn—Oct. 10, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in Kings Hy., Linden Blvd., Fort Hamilton Parkway, Lott Pl., Banner, Harway, Ralph, Stone, 10th and 13th Aves., Berriman, Milford, Pacific, 81st, 83rd, 86th, 96th, Bay 41st, East 6th Sts.

N. Y., Long Island City—Oct. 7, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in Union Turnpike, 31st, Penelope, 35th, 53rd, 31st and 60th Aves., 23rd, 46th, 58th, 79th, and 84th Sts.

N. Y., New York—Oct. 7, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., removing and resetting low and high pressure fire hydrants, appurtenances, transferring taps, and rearranging connections on existing watermains, 2nd Ave., Broome, Chrystie, Forsyth, Grand and Hester Sts.

O., Campbell—Bd. Control, bids about Nov. 18, extending water mains. $35,000.

Wash., Seattle—Bd. P. Wks. bids about Oct. 18, 66 in. pipe line connecting main supply line and 48 in. line running to reservoirs, steel standpipes, each 30 ft. high and 92 ft. diam., $2,000,000; also 75 m.g. reservoir, $700,000. R. H. Thomson, city engr. Noted Sept. 18.

Ont., St. Thomas—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Beverly Hills—B. J. Firminger, city clk., 6,980 ft. 16 in. c.i. pipe line, to F. B. Gridley, 2304 Walnut Terrace Heights, Los Angeles, $31,489. Noted Aug. 28.

Calif., Los Angeles—City Harbor Dpt., furnishing, placing 4,500 lin. ft. 24 in. Class B bell and spigot c.i. pipe, incl. fittings, to Southern California Constr. Co., 111 Messanger St., $31,485.

Ill., Chicago—City at office Bd. Local Impvts., City Hall, water service pipes in Le Mai Ave., Byron and North Whipple Sts., to G. D. Hardin, 3130 Indiana Blvd. — East 121st Pl., South Racine, South Seeley, South Hoyne, South Hamilton Aves., to Washington Plumbing & Heating Co., 461 North Halsted St.; West 82nd and 79th Places, North Long, Catalpa, Rascher, North Mulligan, Balmoral and Catalpa Aves., to J. P. Collins, 5521 Bway.; West 66th St., West 65th and 66th Places, South Keeneeh and South Kolman Aves., to Walsh & Metzger, Inc., 6828 South Chicago Ave. — North Keystone, North Karlov, North Kedvale, North Keeler, North Tripp, North Kildare, North Lowell, and Ridgeland Aves., to Reliance Plumbing Co., 2430 West Van Buren St.

Ind., Jeffersonville — State Forestry Dpt., Indianapolis, 20 ft. earth dam with concrete core wall and spillway, 5,800 cu.yd. earth fill, 415 cu.yd. concrete work, Clark Co., near here, own forces under supervision R. C. Van Drew, field engr., Clark Co. State Forestry, Henryville. Noted Sept. 25.

See proposal advertising on page 146

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LEADITE

Trade Mark Registered U.S. Pat. Office

Wherever Bell & Spigot Water Mains are laid—

—the name LEADITE is well and favorably known to water works men

NOTE

The Pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
Saves at least 75%

THE LEADITE COMPANY
Land Title Building Philadelphia, Pa.

No Caulking

Waterworks (Continued)

La., Kenner—Bd. Comrs. East Jefferson Waterworks Dist. 1, laying various sized pipe, to G. J. Robinson Co., Pine Bluff, Ark., $79,966. Noted Aug. 7.

Mass., Billerica—Boston & Maine R.R. Co., W. J. Backes, Boston, ch. engr., water supplies, incl. pipe line, pump house, to Pitman & Brown Co., 11 Washington St., Salem. Est. exceeds $15,000.

Mass., Boston—Metropolitan Water Supply Comn., 24 School St., electrical equipment for outlet works, Shaft 1, Wachusett-Coldbrook Tunnel, West Boylston, to Anderson-Coffey Co., 280 Tremont St., $8,850. Noted Sept. 18.

Mich., Detroit — Bd. Water Comrs., 735 Randolph St., furnishing 27,000 ft. 8 in. Universal c.i. pipe, in 6 ft. lengths, to be connected by bolts, f.o.b. cars, Detroit, to Central Fdry. Co., Bessemer, Ala., at $0.757 per ft., total $20,439; 55,000 ft. 8 in. DeLavaud centrifugal pipe, f.o.b. cars, Detroit, to Lynchburg Fdry. Co., Lynchburg, Va., $0.7975, total $43,963. Noted Aug. 21.

Minn., Minneapolis—City, 10 rate controller gages for Water Dpt., to Builders Iron Fdry. Co., 9 Codding St., Providence, R. I., $4,810; eight 12 in and four 16 in. gate valves, to Columbian Iron Wks., 2501 Chestnut St., Chattanooga, Tenn., at $62 and $158 each respectively. Noted Sept. 11.

Mont., Great Falls—For 4 m.g. concrete reservoir, to Lease & Leigland, Great Falls, $95,364. Noted Sept. 11.

N. J., Trenton — C. N. Leathem, Jr., state archt., Trenton, vacuum return pump, underground conduit for cottages at Jamesburg, to Nelson Piping & Equipment Co., 706 Delancy St., Phila., Pa., $5,800. Noted Sept. 4.

Okla., Tipton—City will install 4,500 ft. 4 in. c.i. pipe, 7 valves and boxes, 6 hydrants, 600 lb. lead, 3,500 ft. 8 in. vitr. clay pipe, own forces. A. B. Carley, city engr.

Ont., St. Thomas—City, enlarging filtration plant, incl. extension to buildings, filters, pumps, piping, day labor under supervision W. C. Miller, city engr., City Hall, $95,000. Gore, Nasmith & Storrie, Confederation Life Bldg., Toronto, consult. engrs. Noted Sept. 18.

SEWERS

PROPOSED WORK

Ala., Montgomery—City, W. A. Gunter, mayor, sanitary sewers in Watts, Smythe, Maggie, Shepherd, Clopton, Grove, Poplar, Pine, Spruce, 1st, 2nd and West Sts. J. M. Garrett, city engr.

Calif., San Diego—Sewage disposal plant (will have water conservation plant in connection with treatment plant and effluent will be used to irrigate college grounds). $25,000. State Dpt. P. Wks., Division Architecture, Pub. Works Bldg., Sacramento, engrs.

Calif., Los Angeles—Bd. P. Wks., City Hall, soon takes bids Jefferson Storm Drain, Sect. 4, incl. storm drain, sanitary sewers, curbing, guttering, walks, 12- to 21-in. cement pipe with rein.-con. centrifugal galvanized pipe, rein.-con. box section, average depth 9 ft. maximum depth 18 ft., minimum depth 4.5 ft., 113,250 cu.yd. excav. $800,000. L. W. Armstrong, City Hall, ch. storm drain engr.

Calif., Newport Beach—For 8,500 ft. outfall sewer, sewage treatment plant. $165,000. Currie Eng. Co., Anderson Bldg., San Bernardino, engrs. Noted July 24.

Conn., Middletown — Town, F. J. Beilefield, mayor, City Hall, sewage disposal plant. $1,000,000. Engineer not selected.

Ind., Washington — Sewage disposal plant. To exceed $25,000.

Minn., Bemidji — Sewage treatment plant. $100,000. L. P. Wolff, 903 Globe Bldg., St. Paul, engr.

Minn., South St. Paul—Sewage pumping station. $50,000. P. R. Banister, North St. Paul, engr.

O., Cleveland—City, R. H. Davis, dir. Pub. Serv., retained G. B. Gascoigne engr., Leader Bldg., to make survey to determine type and size sewage disposal to be erected at East 140th St. and Lake Erie. Ultimate cost $12,000,000.

O., East Canton—Sanitary sewers, constructing sewage disposal plant in East Canton Sanitary Sewer Dist. $100,000 or more. G. Davidson, Canton, engr.

Okla., Bartlesville—Preliminary plans sewage disposal plant. $30,000. J. H. McCormick, Batesville, engr.

Okla., Tulsa—For Sect. 2—Cat Creek Relief Storm Sewer. $85,000. H. A. Parker, City Hall, engr.

Pa., Hollidaysburg — Bd. Directors Blair County Poor, sewage disposal plant, near here. $35,000. **Maturity this winter.** Address H. Seil, c/o owner, secy. G. S. W. Brubaker, Hollidaysburg, engr.

Ont., Ottawa—Secretary Bd. Control soon takes bids relief sewer in Glebe Sect., $100,000; also relief sewer from Rideau St. to Ottawa River on King Edward Ave. $250,000. A. F. Macaleum, city engr.

Ont., Sudbury—For 8 in. and up vitr. tile sanitary sewers in lane near Albert St., $1,300; storm sewer in Lorne St., $53,258. W. McMullen, Mackie Blk., engr.

Ont., Waterloo—City Council, sewage disposal plant addition, $35,000; pipe line extension $45,000. James, Proctor & Redfern, 1104 Excelsior Life Bldg., Toronto, archt. Noted June 19.

BIDS ASKED

Calif., Los Angeles—Oct. 8, by Los Angeles Co. Sanitation Dist. 8, 3,501 ft. 18 in., 2,862 ft. 12 in., 2,701 ft. 10 in. sewer with concrete bed, vitr. or machine made concrete pipe, 15 manholes, 9 junction chambers. A. K. Warren, 202 Law Bldg., engr.

Calif., Pasadena — City Council taking bids 4,500 ft. 8 in. vitr. sewers, 930 ft. 4 in. c.i. pipe, 24 manholes, 4 flush tanks, wye branches in Avenue 64.

Mass., Boston—Oct. 6, by Dpt. P. Wks., J. A. Rourke, comr., sewerage works Harrison Ave., city proper; Oct. 9, in Crescent Ave., Dorchester. $25,000.

Mich., Detroit—Oct. 9, by Wayne Co. Drain Commissioner, 1601 Barium Tower, 500 ft. 6 in. risers, 12- to 48-in. tile drain, 45 manholes, septic tank, headwall, outlet line, 15,357 ft. 6- to 48-in. rein.-con. or vitr. clay pipe, in Lateral Dist. 94, Wayne Co. No. 2 Tile Drain, Taylor Twp. E. M. Orr, 307 Calvin Theatre Bldg., Dearborn, engr.

Mich., Detroit—Oct. 10, by Wayne Co. Drain Commissioner, 1601 Barium Tower, 6,254 ft. 12- to 66-in cylindrical drain, 750 ft. 10 in. catchbasin leads, 24 catchbasins, 21 manholes in Moore Ave. in Allen and Lincoln Parks. Geo. H. Ruhling & Co., 900 Lawyers Bldg., engrs.

Mich., Lapeer — State, Lansing, taking bids additions to sewage treatment plant, for Michigan Home and Training School. E. D. Rich, State Dpt. Health, Lansing, engr.

Minn., Fairmont — Oct. 7, by City, sewage disposal plant. $25,000. C. Foster, 612 Sellwood Bldg., Duluth, engr. A. J. Anderson, city engr. Noted Nov. 14, 1929.

New Jersey — Oct. 23, by Joint Meeting, Cities of East Orange, Newark and Summit, Towns of Irvington and West Orange, Village of South Orange, and Hillside, Millburn and Union Twps., for Supplementary Joint Trunk Sewer, Sect. 1, Contr. A, portion Sect. 1, and Contr. B, portion Sects. 1 and 2, in city of Elizabeth. A. Potter, 50 Church St., New York, engr.; adv. E. N.-R. Oct. 2. Noted Feb. 13.

N. Y., New York—Oct. 9, by H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., sewers in Bolton and Furman Aves.

N. Y., St. George—Oct. 8, by J. A. Lynch, pres. Richmond Boro, Boro Hall, sanitary sewers both sides Richmond Rd., temporary sewer in Hunter Ave.

O., Cleveland Heights—Oct. 6, by City, sewers in Monticello Sewer Dist. 7, and combined sewer in Grandview Ave. F. R. Pease Eng. Co., Terminal Tower, Cleveland, engrs.

Pa., Phila.—Oct. 15, by Dpt. P. Wks., Bureau Eng. & Surveys, Schedule A, branch sewers in Mt. Pleasant Ave., C. Claridge, Howland, Disston, Kingsley, Knorr, Provident, Bayard, Saul, 16th and Tabor Sts.; Schedule B, sluice in bank of Darby Creek at county line. A. Murdock, dir. P. Wks., City Hall Annex.

S. D., Sioux Falls—Oct. 6, by Bd. City Comrs., sewers in Sewer Dist. 25 1st St., Indiana and Fairfax Aves. W. C. Leyse, city aud. Noted Sept. 25.

Wash., Mount Vernon—City Comn. bids about Oct. 4, 21,635 ft. 6- to 30-in. concrete or tile sewers 910 ft. 18- to 30-in. c.i. pipe, 27 catchbasins, 17 manholes. $110,000. C. E. Dorisy, Republic Bldg., Seattle, engr.

Ont., Toronto — Oct. 7, by W. S. Wemp, mayor, City Hall, storm sewers in Dufferin St., 2 lanes, Eastern Harbor Development System C, Eastern Harbor Development, Keating St., Sects. A and B. $75,000. R. C. Harris, city engr.

Ont., Windsor—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles — Sanitary sewers, manholes, resurfacing 98th St. and Alabama Street Sewer Dist., to Skoro & Pizula, 475½ South Gage St., $47,955.

Calif., San Francisco—S. J. Hesetr, secy. Bd. P. Wks., City Hall, College Hill Tunnel Sewer, incl. 6,500 lin.ft. 4 ft. 6 in. to 6 ft. circular sewer, 4,300 of which will be in tunnel, to T. E. Connolly, 461 Market St., $251,617. Noted Sept. 4.

Ind., Brazil—Pumping plant for sewage plant, to J. A. Sheehan & Co., Brazil, $12,785.

Mo., St. Louis—Bd. P. Serv., City Hall, Sect. B, Maline Creek Public Sewer, to Fruin-Colnon Contg. Co., Merchants-Laclede Bldg., $259,186 est. $317,000; Sect. A, Bradon Pl. Public Sewer, to Riley Contg. Co., 410 North 7th St., $93,068 est. $119,480. Noted Aug. 28.

N. Y., Albany—Bd. Contr. & Supply, City Hall, trunk sewer in westerly portion 13th Ward, to O. Johnson, 268 2nd St., $33,241. Noted Sept. 4.

O., Columbus — W. H. Duffy, dir. Serv., Olentangy-Scioto Relief Sewer, 22, 2,100 ft. 11 ft. 9 in. and 3,900 ft. 10 ft. 3 in. rein.-con. pipe, and short section rectangular connection 12 ft. x 10 ft. 6 in., special section across main intercepting sewer, to W. S. Rae, Oliver Bldg., Pittsburgh, Pa., $597,300. Noted Aug. 28.

O., Warrensville Heights (br. Cleveland)—Village, storm and sanitary sewers, connections in Amherst and Warrensville Center Rds., to Angelo Marra Co., 1479 Green Rd., South Euclid, $5,263; Sunset Dr., Kings Hy., Balfour, Gladstone, Halifax and Ridgewood Rds., to Essi & Haddad, Inc., 2196 West 100th St., $26,474.

Okla., Cordell—P. Peters, city clk., 2,800 ft. 15 in. vitr. clay outfall sewer, disposal plant, Imhoff tank, to J. D. Wann, 1115 West Main St., Oklahoma City. $34,803. Est. $39,000. Noted Sept. 18.

Okla., Tulsa — Bd. City Comrs., F. P. Kitchen, aud., Storm Sewer Project 9-H-30, to Smedley Constr. Co., 2756 East 25th St., $57,841. Est. $87,195. Noted Sept. 18.

Okla., Westville—P. Hayes, city clk., 12,700 ft. 10 and 12 in. concrete sewers, disposal plant, Imhoff tank, to Earl W. Baker & Co., Perrine Bldg., Oklahoma City, $29,199. Est. $40,000.

R. I., Newport—Sewerage plant, sewers, to Hudson Constr. Co., 137 Kay St., $34,725 est. $35,000.

Tenn., Memphis—D. C. Miller, city clk., outfall sewers, treatment tank in Normal Section, to H. A. McGuire & Co., Dermon Bldg., $43,135.

Tex., Dallas—City, c/o E. Goforth, secy., outlet sewer in Warren Ave., to Dallas Constr. Co., 3106 Commerce St., $162,628. Noted Sept. 4.

Ont., Sudbury—For 7,000 ft. 48 in. concrete sewer, to R. H. McGregor Constr. Co., 79 Adelaide St. E., Toronto, and A. Chirico, 203 3rd Ave. W., North Bay, $87,112.

Ont., Toronto—City, 3 m.g.p.d. centrifugal sludge pump and two 11½ m.g.p.d. sewage pumps, to Turbine Equipment Co. Ltd., 73 King St. W., $53,250.

Ont., Toronto—B. S. Wemp, mayor, City Hall, to Dileo & Co., 239 Bellwoods Ave., sewers in 2 lanes $963, Parliament St. $2,375, Princess St. $7,555; to A. Cavotti, 132 Vaughn Rd., Shaw St. $9,258, Scott St. $12,705; to Grant Contg. Co. Ltd., 47 Wellington St. W., George St. $13,595. Grand total $46,451. Noted Sept. 5.

Ont., Windsor—City, 8 in. vitr. tile sewer in Hall, Gladstone, May, Lens and Parkwood Aves., day labor. $180,000. R. J. Desmarais, city engr. Noted July 31.

BRIDGES

PROPOSED WORK

California — State Hy. Comn., Sacramento, 1,414 ft. overhead crossing over Santa Fe R.R. at Bradley, Merced Co.—2,182 ft. overhead crossing over Bear Creek, Merced Co.—4 timber bridges, approaches east of Lost Hills, Kern Co.—679 ft. steel arch bridge at Pulga, Butte Co.—three 35 ft. span, rein.-con. girder bridge over Redwood Slough, San Mateo Co.—106 ft. filled spandrel rein.-con. bridge over Gaviota Creek, Ventura and Santa Barbara Counties—widening 4 concrete spans, total 216 ft. at Topanga Creek, Los Angeles Co. C. H. Purcell, hy. engr.

Calif., Los Angeles—Los Angeles Co., steel bridge at 1st and Glendale Blvd. $350,000 exclusive of property damage. $650,000 total est. City Bridge Dpt., City Hall, engrs.

Calif., Riverside—Riverside Co. 200 ft. concrete bridge over Valle Vista Wash on Idyllwild Rd. A. C. Fulmor, Riverside, co. surv.

Colo., Montrose—Montrose Lions Club suspension bridge, 1,300 ft. high, over Black Canyon of Gunnison River, near here. E. H. Schneider, Denver, engr.

Colo., Pueblo—City Council, c/o G. W. Clark, clk., surveys rebuilding east half South Main St. Viaduct, steel, over Denver & Rio Grande Western Yards. $35,000. D. P. Gaymon, city engr.

Kan., Paola—Miami Co. preliminary plans 80 ft. deck girder bridge over Wades Branch on Wellsville Rd.—50 ft. rein.-con. deck girder span over Packard Branch on Osawatomie-Lane Rd.—40 ft. rein.-con. deck girder span over Dorsey Branch, all 24 ft. wide. F. Poole, Court House, engr.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., Metropolitan Dist. Comn., 1 Ashburton Pl., Boston, sketches bridge over Charles River between Boston and Cambridge. To exceed $25,000.

Mo., Beverly—Chicago, Great Western R.R., C. G. Delo, ch. engr., Grand Central Station, Chicago, Ill., and State Hy. Comn., Jefferson City, rein.-con. viaduct to carry roads across State Hy. 45, Platte Co., near here. $31,742.

Okla., Choctaw—Oklahoma Co. (Oklahoma City) span 320 ft. steel truss bridge on concrete piers. $35,000. J. F. Frazier, Court House, Oklahoma City, engr.

Okla., Edmond—Oklahoma Co. (Oklahoma City) 6 span 118 ft., rein.-con. bridge. $25,000. J. F. Frazier, Court House, Oklahoma City, engr.

Okla., Sasakwa—E. Cooper, clk. Seminole Co. (Wewoka), received no bids Sept. 8, 6 span 94 ft. bridge. Noted Sept. 4.

Texas—Guadalupe Co. (Seguin) Bexar Co. (San Antonio), and State, 160 ft. rein.-con., steel vehicular bridge over Cibalo River. $80,000. W. S. Goodwin, San Antonio, engr. Bexar Co. and A. Schlafli, Seguin, engr. Guadalupe Co.

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Bridges (Continued)

Tex., Houston — Concrete bridge on Almeda Rd. $40,000. J. Nagle, engr.

BIDS ASKED

Ark., DeQueen—See "Contracts Awarded."

Calif., Santa Cruz—Oct. 7, by H. E. Miller, clk, Santa Cruz Co., 91 ft. rein.-con. bridge with 61 ft. span, 30 ft. wide, two 15 ft. sidewalks over Boulder Creek. L. Bowman, Santa Cruz, co. surv.

Conn., New Haven — City, Pub. Wks., City Hall, taking bids repairing concrete piers, abutments mechanism, etc., erecting wrought iron pipe rail and wire mesh for lift bridge over West River, Kimberly Ave. and draw bridge over Quinnipiac River, on Grand Ave. $25,000. E. Nettleton, city engr.

Ind., Crown Point—Oct. 7, by Bd. Comrs. Lake Co., Bridge 117 over Grand Calumet River, on Hoiman St., $10,500 — Hammond Bridge 219 and 209 over Little Calumet River, Calumet Twp., $14,500 and $14,000 respectively. W. E. Whitaker, Crown Point, aud.

Ind., Crown Point — Oct. 7, by Bd. Comrs. Lake Co., Bridge 135 over Little Calumet River, $5,000—Bridge 309 over Deep River at Liverpool, $25,000—Bridge 526 over Deer Creek, Hobart Twp., $3,000—Bridge 353 over Burns Ditch, Hobart Twp., $17,000—Bridge 727 over Beaver Dam Ditch, $6,500—Bridge 1109 over Vanatta Ditch, $2,500 — Bridge 1180 over Brown Ditch, $7,000—Bridge 407 over Turke Ditch, $6,300. W. E. Whitaker, Crown Point, aud.

Ind., South Bend—Oct. 20, by Bd. Comrs. St. Joseph Co., Court House, 22 rein.-con. bridges, culverts. $89,075. F. P. Crowe, co. aud.

Indiana and Kentucky—Oct. 28, by J. J. Brown, dir. state Hy. Comn., Indianapolis, Ind., Contr. 1, 5 main river piers A to E (inclusive) limestone, concrete on rock strata underlying the river bottom, Contr. 2 metal work in superstructure of main river bridge, roadway paving on metal work from Pier A to Pier E, 10 navigation light fixtures, for bridge over Ohio River from Indianapolis, Ind. to Henderson, Ky.; Oct. 30, Contr. 3 masonry supports, abutments and piers of Indiana and Kentucky approaches, Contr. 4, metal work in superstructure, roadway paving of Indiana and Kentucky approaches, $4,000,000. R. Modjeski & E. F. Masters, Keystone Bldg., Harrisburg, Pa., 309 Lexington Ave., New York, and 1420 Walnut St., Phila., Pa. engrs.

Maryland — Oct. 7, by State Roads Comn., Baltimore, G. U. Uhl, chn., removing existing bridge superstructure over Deer Creek, Contr. 102-42, Harford Co.; adv. E. N.-R. Oct. 2.

Minnesota—Oct. 14, by State Hy. Dpt., St. Paul, Bridge 4930 on S.P. 21-21, at St. Peters—Bridge 3695, S.P. 20-24, north of Preston—Bridge 3707, S.P. 20-26, south of Chatfield—Bridge 5032, S.P.20-37, Sect. 1, at Preston.

Missouri—Oct. 10, by State Hy. Comn., Jefferson City, bridges in Butler, Camden, Dade, Gentry, Jasper, Knox, McDonald, Macon, Mississippi, Newton, St. Louis, Washington and Wright Counties. T. H. Cutler, ch. engr.

Mississippi—See "Streets and Roads."

N. J., Linwood—Oct. 8, by Bd. Freeholders Atlantic Co., Guarantee Bldg., Atlantic City, reconstructing steel, concrete bridge at Bargaintown Mill Pond. $25,000. A. H. Nelson, 741 Guarantee Trust Bldg., Atlantic City, co. engr.

Ohio — Oct. 14, by R. N. Wald, dir. Hys., Columbus, bridges in Guernsey, Hamilton, Marion, Miami and Tuscawaras Counties. $126,611.

O., Cincinnati—Oct. 11, by Cincinnati Union Terminals Co., H. M. Waite, ch. engr., Temple Bar Bldg., rein.-con. bridge, Western Hills. $3,500,000.

O., Toledo—Oct. 21, at office W. H. Schroeder, dir. Pub. Serv., strengthening, repairing Summit St. Bridge; adv. E. N.-R. Oct. 2.

Okla., Asher—Oct. 6, by C. E. Pettigrew, clk. Pottawatomie Co., Tecumseh, 7 span 104 ft. rein.-con. bridge. $25,000. J. H. Merkle, Tecumseh, engr.

Okla., Knowles—Oct. 6, by C. Crossley, clk. Beaver Co. (Beaver) 21 span 407 ft. pile trestle bridge. $25,000.

Okla., Maude—Oct. 6, by C. E. Pettigrew, clk. Pottawatomie Co., Tecumseh, 6 span 96 ft. rein.-con. bridge. $25,000. J. H. Merkle, Tecumseh, engr.

Okla., Washita—Oct. 6, by F. Woodrow, clk. Grant Co., Medford, 4 span 66 ft. rein.-con. bridge. $25,000. S. Hott, Medford, engr.

Pennsylvania—See "Streets and Roads."

Pa., Phila.—Oct. 15, by Dpt. P. Wks., Bureau Eng. & Surveys, City Hall Annex, A. Murdock, dir., bridges on Sun Ave. and Bristol St., $90,000 available; on Mascher St., $65,000 available.

Wisconsin—See "Streets and Roads."

Ont., Chatham — Oct. 6, by W. G. George, Bank of Commerce Bldg., Chatham, bridge over Thames River, at 5th St., incl. rasing present structure, constructing piers, abutments and counterweights, temporary crossing. $250,000. W. G. George, Bank of Commerce Bldg., substructure engr. Scherzer Rooling Lift Bridge Co., 53 West Jackson Blvd., Chicago, Ill., superstructure engr. Noted Mar. 20.

Ont., Toronto — Oct. 21, by B. S. Wemp, mayor, City Hall, 3 span 400 ft. steel girder bridge on concrete abutments, piers, approaches, retaining walls over Humber River, on Lake Shore Rd. $750,000. R. C. Harris, city engr. Noted Aug. 8, 1929.

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CONTRACTS AWARDED

Arkansas—State Hy. Dpt., Little Rock, steel truss span bridge, Scott Co., to Vincennes Bridge Co., Vincennes, Ind., $48,892. Est. $60,000.

Ark., DeQueen—Texarkana & Ft. Smith Ry. Co., Texarkana, W. G. Morgan, ch. engr., c/o Kansas City Southern Ry., Kansas City, Mo., A. N. Reese, ch. engr., reconstructing three 84 ft. steel girder spans, approaches on trestle over Little River, Morris Ferry, near here, own forces. Noted Aug. 14.

Ga., Augusta — State Hy. Bd., East Point, steel superstructure bridge, S.A.P. 422-C, to Nashville Bridge Co., foot of Shelby Ave., Nashville, Tenn., $107,487; concrete substructure, S.A.P. 522-C, to Wannamaker & Wells, Orangeburg, S. C., $87,400 est. $90,000, both Richmond Co. Noted Aug. 28.

Illinois—State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, bridges in McDonough Co., to H. C. Holmes, Macomb, $16,748 — McDonough Co., to Mississippi Valley Structural Steel Co., Decatur, $29,782—Stephenson Co., to W. A. Liljequist, Freeport, $3,469—Madison Co., to Edwardsville Constr. Co., Edwardsville, $9,003—Union Co., to W. F. Fogleman, O'Fallon, Mo., $23,981—Lake Co., to L. B. Fugitt Constr. Co., 307 North Michigan Ave., Chicago, $38,322—Sangamon Co., to M. C. Robinson, Girard, $12,397. Grand total $133,738. Noted July 4 and 24.

Maine—State Hy. Dpt., Augusta, Kennebec Bridge, near Dresden, to American Bridge Co., Statler Bldg., Boston, $86,766. Noted Sept. 11.

Maryland — State Roads Comn., Baltimore, substructure Priest Ford Bridge, Contr. H-99-42, Harford Co., to Woolfolk & De Jarnette, Princeton, W. Va., $5,619. Noted Aug. 28.

Maryland—State Rds. Com., Baltimore, double leaf bascule span for bridge over Nanticoke River, at Vienna, Contr. D-65-17, Dorchester Co., to A. S. Fox, 24 North Canal St., Dayton, O., $36,505. Noted Aug. 7.

Mass., Attleboro—City, J. O. Taber, Jr., supt. P. Wks., rein.-con., slab bridge Holden St., to Engineering Serv. & Constr. Co., 161 Devonshire St., Boston. Est. $25,000.

Minnesota—State Hy. Dpt., St. Paul, constructing Bridge 4952, S.P. 5-28, at Mankato, to Widell Co., Mankato, $128,457—Bridge 4990, S.P. 2-40-1, at McGrath, and Bridge 4900, S.P. 2-40-1, Cromwell, to J. E. Donlin, 1959 Princeton Ave., St. Paul, $15,462 and $16,423 respectively—Bridge 4800, S.P. 70-21, south of Fairfax, to Minneapolis Bridge Co., 701 Metropolitan Life Bldg., Minneapolis, $49,800 — Bridge 4942, S.P. 20-36, at Rochester, to Guaranty Constr. Co., 416 Essex Bldg., Minneapolis, $26,875. Grand total $237,017. Noted Sept. 4.

New York — A. W. Brandt, comr. Hys., Albany, bridges in Essex Co., to W. A. Sanderspree, Fort Edwards, $19,191 est. $23,147—Montgomery Co., to Albany Bridge Constr. Co., 518 Bway., Albany, $66,622 est. $89,490—Herkimer Co., to F. A. Ray, Herkimer, $7,689 est. $11,356—Cattaraugus Co., to W. S. Meserve & Co., Buffalo, $21,242 est. $31,533—Oswego Co., to W. Bradley, Fulton, $60,207 est. $79,876—Rensselaer Co., to P. E. Antolick, Schachticoke, $45,206 est. $61,541—Steuben Co., to W. L. Collins, Hornell, $17,321 est. $23,919—Chenango Co., to K. S. Baker, Binghamton, $37,334 est. $52,090. Grand total $274,812. Noted Aug. 14 and 28 under "Streets and Roads."

Okla., Eldorado—State Hy. Dpt., Oklahoma City, 2,000 ft. pile trestle bridge over Red River, Jackson Co., to Gaines & Yoakum, 519½ West Main St., Oklahoma City, $69,945. Est. $80,000.

South Dakota—State Hy. Comn., Pierre, bridges in Codington Co. and Clay-Turner Counties, to Boonan & Hyde Co., Watertown, $6,825 and $15,053 respectively—Dewey and Fall River Counties, to Pioneer Bridge Co., Mitchell, $13,369 and $5,737 respectively—Buffalo Co., to Diamond Eng. Co., Grand Island, Neb., $4,818—Shannon and Custer Counties, to W. Bonesteel, Wagner, $8,911 and $5,621 respectively—Fall River Co., to Nolan Bros., 18 North 2nd St., Minneapolis, Minn., $56,493. Grand total $116,827.

Texas and Oklahoma—G. Gilchrist, state hy. engr., Austin, Tex. and A. R. Losh, state hy. engr., Oklahoma City, Okla., 67 span 1,909 ft. steel, concrete bridge over Red River, Hy. 51, between Hardeman Co., Tex. and Jackson Co., Okla., to Gaines & Yoakum, 519½ West Main St., Oklahoma, Okla., $69,950. Est. $100,000. Noted Sept. 11.

Tex., Houston—State and Harris Co., 2 span, 400 ft. steel bridge with concrete trestle approaches over San Jacinto River to Standard Constr. Co., Pierce and Eastwood Sts., $197,218. Est. $200,000.

Wisconsin—State and Eau Claire, St. Croix and Trempealeau Counties Hy. Comns., Eau Claire, New Richmond Overhead, S.P. 6994, to J. E. Hinman & Son, Glenwood City, $8,996—Michels Nos. 1 and 2 Bridges, F.A.P. 368-D, to E. Blank, Cochrane, $6,306 and $6,477 respectively—Riphenberg Bridge, F.A.P. 368-D, to Metzar & Son, Blair, $1,836—Mayer Bridge No. 2, F.A.P. 368-D, to G. F. Toebe, Chippewa Falls, $860—Hobbs and Devils Elbow Bridges, F.A.P. 368-D, to D. E. Button, Sparta, $1,975 and $2,566 respectively—Wethern Bridge, to S. Swenson, Mount Horeb, $1,316—Siewert Bridge, to E. E. Tobey, Fall Creek, $1,801. Grand total $32,153.

B. C., Lillooet—Pacific Great Eastern Ry., C. L. Bates, engr., maintenance and way, Squamish, substructure steel railway bridge over Fraser River, to Stewart & Barber, 736 Granville St., Vancouver, $60,000. Noted Sept. 4.

Ont., Belleville—City, 2 span 120 ft. highway bridge over Morra River on Hy. 14, to Holderoft Constr. Co., Ltd., 216 Stair Bldg., Toronto, $43,525. Est. $50,000. Noted June 31.

STREETS AND ROADS

BIDS ASKED

Alabama—Oct. 15, by State Rd. Administration, 2 in. asphalt on 6 in. concrete paving 10 mi. Birmingham-Tuscaloosa Hy., Jefferson Co., 18 ft. $180,000. Federal Aid Fund will pay ½, Jefferson Co. (Birmingham) ¼ and State ¼ of cost.

Arizona—Oct. 7, at office State Hy. Comn., Phoenix, hauling, placing, subgrade stabilizer on 22.5 mi. Holbrook-Lupton Hy., F.A.P. 85-A, W. W. Lane, state engr.

Arizona — Oct. 15, by State Hy. Comn., Phoenix, grading, bridging 40 mi. Flagstaff-Fredonia Hy., F.A.P. 95-B. W. W. Lane, state engr.

California—Oct. 15, by Sacramento, grading, untreated crushed gravel or stone paving 0.4 mi. road at High Rock Hill, Humboldt Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Calif., Bell—Oct. 13, by City Council, grading, curbing, guttering, walks, 2½ in. oil macadam paving 181,300 sq.ft., Mayflower St. et al.; grading, curbing, walks, macadam paving 124,000 sq.ft. Loma Vista Ave., et al. T. Bousman, city engr.

Ind., Auburn—Oct. 15, by Bd. Supervs. De Kalb Co., concrete or Kentucky rock asphalt surfacing 7.5 mi. Waterloo-Hamilton Rd., 18 ft. $225,000. C. T. Miser, Auburn, engr.

Ind., Bloomfield — Oct. 7, by Bd. Comrs. Greene Co., gravel surfacing W. D. Bredewig Rd. $25,000. G. R. Hudson, Bloomfield, aud.

Ind., Frankfort—Clinton Co., bids about Dec. 1, concrete surfacing John Dukes Rd. $28,000. N. Amos, Frankfort, engr.

Ind., Lebanon—Oct. 7, by Bd. Comrs. Boone Co., grading, drainage structures, gravel surfacing William F. Sweet Rd. et al.; Washington and Jefferson Twps., $13,999; grading, drainage structures, concrete surfacing S. V. Titus Rd. et al., Sugar Creek Twp., $34,928. M. Harvey, Lebanon, co. engr.

Ind., Terre Haute — Oct. 9, by Bd. Comrs. Vigo Co., grading, drainage structures, gravel surfacing E. C. Coffey Hy. et al., Harrison, Otter Creek and Lost Creek Twps. $36,421. C. C. Pinson, co. aud.

Ia., Independence—Oct. 7, at office Auditor Buchanan Co., gravel surfacing 17.25 mi. local secondary roads.

Kentucky—Oct. 15, by State Hy. Dpt., Frankfort, grading, drainage structures 12.2 mi. Glasgow-Bowling Green Rd., Federal Aid Project 210-G, Barren Co. B. Johnson, chn.

Massachusetts—Oct. 8, by Dpt. P. Wks., Boston, rein.-con. paving 2,800 ft. by Arlington; bituminous macadam paving 15,950 ft. Windsor, A. W. Dean, Dpt. P. Wks., Boston, engr.

Mass., Boston—Oct. 8, by Dpt. P. Wks., J. A. Rourke, comr., grading Morton St., Dorchester, $25,000; sheet asphalt or bitullithic paving Rogers Park Ave., Ward 22, $25,000.

Mass., Malden (br. Boston)—See "Contracts Awarded."

Mass., Newburyport — See "Contracts Awarded."

Mass., Salem—Oct. 3, by Essex Co., Court House, grading, curbing, sidewalks, bituminous macadam paving approach to Kernwood Bridge, Beverly. $25,000. R. R. Evans, Court House, engr.

Mass., Salem—See "Contracts Awarded."

Minnesota—Oct. 14, by State Hy. Dpt., St. Paul, grading 6.6 mi. F.A.P. 27C, S.P. 3-53, Sect. 2—17.1 mi. S.P. 5-41, F.A.P. 26A and S.P. 5-38, Sect. 4, F.A.P. 422A—21 mi. S.P. 7-31, Sect 1, F.A.P. 109A—5.3 mi. S.P. 9-28, F.A.P. 147B — 280,000 cuyd. S.P. 20-37, Sect. 2, F.A.P. 137.

Minn., St. Paul—Oct. 7, by C. A. Carlson, city purch. agt., grading, paving 3rd St. between Bway. and John St. To exceed $25,000. W. A. Carey, city engr.

Mississippi—Oct. 13, by State Hy. Comn., Jackson, concrete, sheet asphalt, asphaltic concrete or rock asphalt surfacing, bridging 13.489 mi. Jackson-Pocahontas Rd., F.A.P. 198-A, Hinds Co.—7.412 mi. Laurel-Meridian and Laurel-Ellisville Rds., F.A.P. 183 and 70-B respectively, Jones Co.—10.871 mi. Tougaloo-Canton Rd., F.A.P. 79-B, Madison Co.—7.642 mi. Itta Bena-Greenwood Rd., F.A.P. 195-B and 205-A, Leflora Co.—11.296 mi. Meridian-Livingston (Alabama) Rd., F.A.P. 117, Lauderdale Co.—3.977 mi. Pocahontas Rd., F.A.P. 198-B, Madison Co. C. M. Williamson, dir.

Miss., Canton—Oct. 7, by Hy. Com. of Dist. 3, Madison Co., gravel surfacing 5 mi. Goodloe Rd.

Missouri—Oct. 10, by State Hy. Dpt., Jefferson City, improving 89.329 mi. roads in Audrain, Boone, Butler, Camden, Clay, Dade, Gentry, Jasper, Knox, Macon, Madison, McDonald, Newton, St. Clair, St. Louis, Washington, Wright and Saline Counties.

Mo., Clayton — Oct. 8, by St. Louis Co., Court House, rein.-con. paving 4,005 ft. Litzinger Rd.—7,286 ft. Dallas Rd.—15,605 ft. Marshall Rd.—1,372 lin.ft. Pennsylvania Ave. —855 ft. Southwest Ave.; 700 ft. Old Florissant Rd.—320 ft. Julian Ave.—1,950 ft. Sutter Ave. —bituminous on sledge stone paving 7,654 ft. Woodstock Rd.—7,200 ft. Hibler Rd.—widening, rein.-con. paving intersection Lucas and Hunt Rd. with St. Louis Ave. R. Jablonsky, Court House, co. engr.

Streets and Roads (Continued)

Mo., Clayton—Oct. 15, by St. Louis Co., Court House, concrete paving 51,964 ft. Greenwood Blvd., Smizer, Ballas and Ladue Rds., 20 ft. R. Joblonsky, co. engr.

Nebraska—Oct. 9, by District Engineer, Ainsworth, graveling 12.7 mi. S.A.P. 137-K, Keya Paha Co. R. L. Cochrane, Lincoln, engr.

Nebraska — Oct. 9, by District Engineer, Grand Island, concrete paving 6.3 mi. F.A.P. 3, Div. 1, and grading, bridging, culverts on 7.2 mi. Div. 2, Hall Co.; 9.6 mi. grading S.A.P. 668-A, Sherman Co. R. L. Cochrane, State House, Lincoln, state engr.

Nevada—Oct. 8, by Directors Dpt. Hys., Carson City, constructing 7.68 mi. road from Carson City to point 2 mi. east Mound House, Route 2A, Sects. A and A1, Ormsby and Lyon Counties. S. C. Durkee, state engr.

New York—Oct. 7, by C. MacDonald, engr. Westchester Co., Court House, White Plains, curbing, sidewalks, widening bridge, 9 in. rein.-con. or amiesite, warrenite-bitulithic or asphalt block on concrete paving 1.17 mi. East Lincoln Ave. and 4th St., County Rd. 84, Mount Vernon and North Pelham; adv. E. N.-R. Oct. 2.

New York—Oct. 20, at office general manager Port of New York Authority, 80-90 8th Ave., New York, filling, grading, pumping and reconstructing sewer for roadways of Port Richmond Approach to Kill Van Kull Bridge between Bayonne, N. J., and Port Richmond, N. Y.; adv. E. N.-R. Oct. 2.

N. Y., Beacon—Oct. 3, by Commissioner Correction, Albany, bituminous macadam road at Matteawan State Hospital, $29,342.

N. Y., Brooklyn—Oct. 9, by H. Hesterberg, pres. Brooklyn Boro, Boro Hall, granite block on concrete repaving Greenpoint Ave.,—asphalt on concrete repaving Beverley Rd., East 26th and Sherman Sts.—asphalt on concrete paving 23rd Ave.

N. Y., New York—Oct. 7, by J. Miller, pres. Manhattan Boro, Municipal Bldg., grading, curbing, flagging, sidewalks, sheet asphalt on concrete paving unpaved portions and widened areas Chrystie St., incl. retaining wall, basins and drains, except strip 10 in. wide parallel and adjacent to tracks to be paved with 2 courses of granite block—grading, sheet asphalt on concrete paving Bway., west side, except strip adjacent and parallel to outer rail—grading, sheet asphalt on concrete paving West 89th St.

N. Y., New York—Oct. 9, by H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., bituminous concrete on concrete paving West 232nd and East 231st Sts.—curbing, sidewalks granite block on concrete paving East 139th St.—sheet asphalt on concrete paving Van Courtland Park S. Matthews, Evergreen, Wilder, Harrington, Hammersley, Zulette and Holland Aves., East 232nd, Benson Sts.

N. C., Roxboro — Oct. 7, by City, surface treating 30,000 sq.yd. Spoon & Lewis, Greensboro, consult. engrs.

Ohio—Oct. 14, by R. N. Waid, dir. Hys., Columbus, grading, concrete, brick or macadam paving 5.671 mi. hys. Carroll, Harrison, Franklin, Hamilton and Scioto Counties. $518,933.

Oklahoma — Oct. 13, by State Hy. Dpt., Oklahoma City, grading, drainage 22 mi. Federal Aid Project 220, E. F. and G., 30 ft., Texas Co. $40,000. A. R. Losh, hy. engr.

Okla., Oklahoma City—Oct. 7, by M. Peshek, city clk., grading, concrete paving 9,100 sq.yd. Military St., $36,000. G. F. Brown, City Hall, engr.

Okla., Wewoka—See "Contracts Awarded."

Pennsylvania — Oct. 9, by State Hy. Dpt., Harrisburg, grading, bituminous surface treated macadam surfacing 12,154 sq.yd. Route A-6810-A, Oxford Twp., Adams Co. — 23,407 sq.yd. Route 70, Sect. 1-A, Springdale and East Deer Twps., Allegheny Co.—10,192 sq.yd. Route A-7168-A, Hopewell and North Newton Twps., Cumberland Co.—9,463 sq.yd. Route A-1997 Fairview and Newberry Twps., York Co.—10,816 sq.yd. Route 344, Sect. A-7552 Mystic Twp., Lancaster Co.—grading, one course rein.-con. surfacing 49,338 sq.yd. Route 72, Sect. 6-A, Shaler and Hampton Twps., Allegheny Co.,—4,236 sq.yd. Route A-7565, Hollidaysburg Boro, Blair Co.—6,312 sq.yd. Route A-7328, West Goshen Twp., Chester Co. —49,861 sq.yd. Route 218, Vernon and Union Twps., Crawford Co.—4,446 sq.yd. Route A-2974, Fawn Grove Boro, York Co. — 3,900 sq.yd. Route 672, Sect. A-6886, Lowhill Twp., Lehigh Co.—2,151 sq.yd. Route 161, Mt. Carmel Boro, Northumberland Co. — 63,360 sq.yd. Route 119, Sects. 6-B and 7, Unity Twp., Westmoreland Co.—2 concrete abutments, three piers for truss plate girder superstructure, also removing, erecting temporary bridge, all over Allegheny River at Market St. in Kittanning Boro, Route 251, Armstrong Co.—fabrication, erection 3 span through plate girder bridge, Route R-130, Spur A, Tinicum Twp., Prospect Park Boro, Delaware Co. J. L. Stuart, secy.; adv. E.N.-R. Oct. 2.

Pa., Erie—Oct. 7, by M. J. Hanry, city clk., grading, curbing, drainage structures, paving Holland St., Mill or Cooper Rd. $51,500. A. N. Aitken, City Bldg., engr.

Pa., Phila.—Oct. 14, by Bureau Hys., Dpt. P. Wks., A. Murdock, dir., Schedule A, grading 4 streets—Schedule B, asphalt paving (assessment work) 41 streets and avenues and 2 intersections—Schedule C, country road improving 2 streets — Schedule E, redressed granite block repaving 2 streets—Schedule F, asphalt repaving (part assessment work) 1 street—Schedule G, grading, paving Overhill Avenue—Schedule H, furnishing, delivering fabricated structural steel for Kensington Avenue Bridge 166.

Pa., Phila.—Oct. 15, by Dpt. P. Wks., Bureau Eng. & Surveys, City Hall Annex, A. Murdock, dir., Schedule C, Pennsylvania Terminal Impvt., Contr. 11, incl. grading, paving 11 streets and boulevards—Schedule D, improving Pennsylvania Ave., $500,000 available — Schedule E, grading, sewers, South Philadelphia Impvt., 25th St., Contr. 215 — Schedule G, Bridge Approach, Henry Ave. over Philadelphia & Reading R.R., $105,000.

Pa., Stockdale—Oct. 7, by P. F. Lambert, boro pres., grading, curbing, sewers, manholes, concrete paving 9,165 sq.yd. Bow, Chestnut, Locust and Railroad Sts. McDonald & Bigler, Municipal Bldg., Charleroi, engrs.

Texas—Oct. 16, by State Hy. Dpt., Austin, and Grimes Co. (Anderson), grading, 3 to 4 large rein.-con. drainage structures, 2¼ mi. Hy. 90 between Navasota and Brazos River. $130,000. Address Grimes Co. Eng. Dpt., Navasota.

Tex., Eldorado—G. Green, city mgr., taking bids alternate types paving 20 blocks. $60,000.

Tex., George West—Live Oak Co. and State Hy. Dpt., Austin, taking bids and open same about Oct. 16, grading, drainage structures 4 mi. Hy. 145, from Three Rivers to Kitty. $45,000. Address County Eng. Dpt., c/o E. L. Riser, judge, three Rivers.

Tex., Harlingen—Taking bids alternate types paving 5 blocks Lincoln and Jackson Sts., 30 ft. $25,000. A. Tamm, 209½ West Jackson St., engr.

Virginia—Oct. 14, by State Hy. Dpt., Richmond, widening Portsmouth Rd., incl. concrete and macadam surfacing 1 mi., Norfolk Co.—widening, concrete and macadam surfacing 3 mi. roadway, Princess Anne Co.—3 bridges near Petersburg, Surry Co. $150,000. H. J. Spelman, ch. engr.; adv. E.N.-R. Oct. 2.

Washington—Oct. 14, by S. J. Humes, dir. Hys., Olympia, grading, 2.4 mi. State Rd. 3 from Teanaway to Bristol, F.A.P. 165-G, Kittitas Co.; grading, crushed stone surfacing 7.3 mi. Methow Valley Hy., Twisp Vicinity, Okanogan Co.

Wash., Seattle—Bd. P. Wks. bids about Oct. 20, paving in Carleton Park Dist., Magnolia Bluff. $68,000. R. H. Thomson, city engr.

Wisconsin — Oct. 10, by State Hy. and Trempealeau Co. Hy. Comns., La Crosse, grading, concrete paving 1.5 mi. Galesville-La Crosse Rd., S.A.P. 5178; constructing Beaver Creek Bridge, S.A.P. 5287.

Ont., London—See "Contracts Awarded."

Ont., Toronto—Oct. 7, by B. S. Wemp, mayor, City Hall, asphalt paving Bathurst St. and Queens Quay—concrete curbing, bitulithic paving Merton St.—concrete paving 11 lanes—brick block paving 1 lane—concrete sidewalks on 9 streets. $75,000. R. C. Harris, city engr.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, gravel surfacing 3.5 mi. hy. Sumter Co., to A. J. Brown Contg. Co., Jasper, $7,055; surface treating 17.54 mi. Dale Co., to Smith Eng. & Constr. Co., Jacksonville, Fla., $63,190.

Arkansas—State Hy. Comn., Little Rock, concrete paving 7 mi. Lawrence Co., to J. B. McCrary Eng. Corp., Citizens & Southern Bank Bldg., Atlanta, Ga., $51,673 est. $70,000 — grading, drainage structures, concrete paving 8 mi. Crawford Co., to Sandy Hites Co., Warsaw, Mo., $76,933 est. $100,000—grading, drainage structures 3.5 mi. Jefferson Co., to Sullivan, Long & Hagerty, Bessemer, Ala., $68,376. Grand total $196,982.

Calif., Los Angeles—Bd. P. Wks., City Hall, grading, curbing, walks, sewers, street lighting, concrete and asphaltic concrete paving Bway. between Pico Blvd. and 41st St., to Griffith Co., Railway Bldg., Los Angeles, $486,275.

Colorado—State Hy. Dpt., Denver, base course gravel surfacing 41.979 mi. Sterling-Julesburg Rd., Project 175-A, Div. 2, Logan and Sedgwick Counties, to O. B. Owen, Box 1984, Denver, $60,690.

Conn., Bloomfield—City, grading, waterbound bituminous macadam paving 3 streets, to A. Brazos & Sons, Inc., 66 Oak St., Middletown. Est. $25,000. Noted Sept. 4.

Florida—State Road Dpt., Tallahassee, broken stone base surfacing 1 mi. Alachua Co., to L. M. Gray, Gainesville, $10,835—19.2 mi. Duval and St. Johns Counties, to R. F. Lassiter Co., Atlantic Natl. Bank Annex, Jacksonville, $300,787—12.58 mi. Levy Co., to Langston Constr. Co., Orlando, $137,055—3.3 mi. Brevard Co., to Standard Asphalt Co. of Florida, Winter Park, $49,915—single bituminous treating 2 mi. Palm Beach Co., to E. F. Powers Constr. Co., West Palm Beach, $28,471 — clearing, grubbing, grading 9.04 mi. Glades Co., to Reid W. Bryan & Co., Auburndale, $117,013 — clearing, grubbing, grading, bituminous treating 1.07 mi. Brevard Co., to J. D. F. Boggs, Sarasota, $32,759—grading, single bituminous on broken stone paving 9.7 mi. Jefferson Co., to Duval Eng. & Contg. Co., Dyal Upchurch Bldg., Jacksonville, $174,505—300,000 gal. oil asphalt for sand treatment, Okaloosa Co., f.o.b. Pensacola, to Shell Petroleum Corp., Canal Bank Bldg., New Orleans, La., $20,160—1,800 lin.ft. 18 in. c.m. pipe, Bradford Co., f.o.b. Raiford, to Dixie Culvert & Metal Co., Jessie St., Jacksonville, $2,322—18,480 gal. oil asphalt, Bradford Co., f.o.b. Hampton, to Pan-American Petroleum Corp., Rhodes-Haverty Bldg., Atlanta, Ga., $979 — 924 tons crushed rock, Bradford Co., f.o.b. Hampton, to Florida Crushed Stone Co., Ocala, $2,929. Grand total $877,730. Noted Aug. 28.

Georgia—State Hy. Dpt., East Point, paving 11 mi. Winder-Bogart Rd., De Kalb Co., and 10.1 mi. Gainsville-Cornelia Rd., Tallulah Co., to Davis Constr. Co., Rhodes-Haverty Bldg., Atlanta, $217,003 and $223,405 respectively.

Idaho — J. D. Wood, comr. P. Wks., Boise, crushed rock surfacing 7.793 mi. Idaho Central Hy., Camas Co., to Idaho Contg. Co., Boise, $62,784. Est. $74,549. This corrects report in Sept. 11 issue.

Idaho—J. D. Wood, comr. P. Wks., Boise, crushed graveling 5.75 mi. road between Alexander and Soda Springs, Caribou Co., to F. G. Redmon, Yakima, Wash., $19,735 est. $18,280.

Illinois — State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, paving roads in Cook Co., to Chicago Heights Coal Co., Chicago Heights, $196,326—Shelby Co., to Breeden Bros. Constr. Co., Centralia, $5,911 — Cumberland Co., to Thornton & Sons, Mattoon, $123,134—Peoria and Sangamon Counties, to J. C. O'Connor & Sons, 2104 Minor Ave., Ft. Wayne, Ind., $57,900 and $140,679 respectively—Iroquois and Ford Counties, incl. bridge, to McMann Constr. Co., Rochester, Ind., $92,400—Morgan Co., to R. P. Devine, Watseka, $26,354—Cook Co., to C. E. Giertz & Sons, Elgin, $33,314—DuPage and Cook Counties, to W. A. Black Co., Bellwood, $17,496 and $40,776 respectively — Boone Co., to J. Fair & Co., Belvedere, $12,132 —Marion and Jefferson Counties, to Rouse Constr. Co., Cape Girardeau, Mo., $415,000—Alexander and Union Counties, to R. L. Williams, Charleston, Mo., $189,541—Menard Co., to R. P. Devine, Watseka, $25,945 — Routes 21X and 116X, Montgomery Co., to G. A. Hackett, Decatur, $9,296 and $7,450 respectively—Cook Co., to J. Mackler & Co., Chicago Heights, $101,591 — Whiteside Co., to Bingham & Rung Constr. Co., 327 South La Salle St., Chicago, $48,514—Hamilton Co., to J. R. Feigel Co., Evansville, Ind., $279,472—Shelby Co., to O. Arnold, Casey, $59,986 — Marion Co., and grading roads in Fayette and Effingham Counties, to Globe Constr. Co., West Side Bank Bldg., Evansville, Ind., $62,442 and $58,168 respectively — Union Co., to S. J. Groves & Sons, 306 Globe Bldg., Minneapolis, Minn., $33,607—Gallatin Co., to Harreison & Johnson, Harrisburg, $22,000—Marshall Co., to E. M. Rocho, Freeport, $23,064—Cook Co., to Thornton Cartage Co., Thornton, $71,553 — gravel surfacing roadway in Bureau Co., to Murphy Co., 5971 Ridge Ave., Chicago, $6,959. Grand total $2,163,980. Noted July 4 and 24.

Ill., Chicago—Officials of World's Fair, 160 North La Salle St., G. Woodruff, treas., rock asphalt on 10 in macadam surfacing 1.5 mi. road adjacent to Illinois Central R.R. from 23rd to 29th Sts., and widening 1 mi. road between Roosevelt Rd. and 23rd St., above roads to take place of Outer Dr., which will be absorbed inside fair grounds, providing two 35 ft. roads divided by park strip, to McGarry Co., 189 West Madison St.

Ind., Evansville — Bd. Comrs. Vanderburgh Co., asphalt surfacing Main Street Extension, to Reichert Constr. Co., 107 Northwest Riverside Dr. $40,300. Noted Aug. 28.

Ind., Evansville—Vanderburgh Co. constructing 13,992 ft. Kuebler Rd., 14 ft., to Globe Constr. Co., 2307 West Franklin St., $31,340. Est. $43,364.

Ind., Indianapolis—Guttering, sheet asphalt paving 16,283 sq.yd. North Illinois St., to Standard Paving Co., 1218 Fletcher Savings & Trust Bldg., $24,625. Est. $46,635.

Ind., Laporte—Bd. Comrs. Laporte Co., concrete surfacing 2 mi. Otto Schultz Rd., to F. Schirr, Westville, $36,325, est. $48,500; gravel surfacing 1.5 mi. D. A. Horney Rd., to Zigler & Baker, Walkerton, $15,215. Noted Aug. 28.

Ind., Versailles—Ripley Co., concrete surfacing 3.07 mi. Charles D. Miller Rd. and 3.46 mi. J. W. Harvey Rd., to Dean Bros., Batesville, $29,493. Est. $37,205. Noted Sept. 11.

Ia., Cedar Rapids—Linn Co., grading 76,000 cu.yd. County Trunk Rd. X, to F. J. Balmer Constr. Co., Waterloo, $14,441. Noted Sept. 4.

Ia., Des Moines—See "Sports and Parks."

Ia., Dubuque—City, c/o J. Stuber, city clk., grading, integral curbing, guttering, removing old macadam and gravel, 6 in. concrete repaving 14,673 sq.yd. Algona, Auburn and Wood Sts., to J. F. Lee Paving Co., Dubuque, at $1.59 per sq.yd.

Ia., Ottumwa—Grading, curbing, 6 in. rein.-con. paving 8,600 sq.yd. 2 alleys, Wapello and Woodland Aves., Ray and Mary Sts., to J. C. Blunk Constr. Co., Ottumwa.

Ia., Sac City—Sac Co., gravel surfacing 5 mi. local roads, 9.5 mi. trunk roads, 4 mi. maintenance gravel surfacing 4 mi. trunk roads, to C. A. Emery, Coon Rapids. Noted Aug. 28.

Kan., Atchison—Brick paving 5 blocks Main, Ash and M Sts., to Gieger & Rutherford, Leavenworth, $24,412.

Kan., Paola—J. L. Lowe, clk. Miami Co., grading 7.214 mi. Osawatomie-Block Benefit Dist. Rd., 28 ft., to Sherwood Constr. Co., Independance, $20,785—Plumer Bridge, 40 ft. deck girder span, to McFarland Constr. Co., McFarland, $7,950—Kimble Bridge, 40 ft. deck girder span, to A. L. Cook, Ottawa, $3,400—Dalton Bridge, 25 ft. deck girder span, 24 ft. wide, to J. Kaufman, Gridley, $1,988. Grand total $34,213. Noted Aug. 28.

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Streets and Roads (Continued)

Louisiana—State Hy. Comn., Baton Rouge, concrete surfacing 1.2 mi. roads in Rapides Parish, to B. J. Carbo, Alexandria, $28,644—4 mi. Lafourche Parish, to Barber Bros. Constr. Co., Bogalusa, $95,075—embankment and drainage structures in St. Charles and Jefferson Parishes, to Stevens Bros. and Miller, Hutchinson Co., Sellers, $63,545. Grand total $187,264. Noted Aug. 14.

Louisiana—State Hy. Comn., Baton Rouge, embankment, drainage structures on 2.3 mi. Moreland-Hall Summit Hy., Red River Parish and Zwolle-Blue Lake Hy., Sabine Parish, to Leathers & Martin, Alexandria, $10,077 and $17,968 respectively; 4.3 mi. Gilbert-Fort Necessity Hy., and 4.2 mi. Wisner-Fort Necessity Hy., Franklin Parish, to J. J. McKeithen, Grayson, $21,731 and $10,919 respectively. Grand total $60,695. Noted Aug. 14.

Maryland — State Roads Comn., Baltimore, sheet asphalt paving 1 mi. Contr. BC-95-72, Baltimore Co., to P. Flanigan & Son, Harford Rd., and Baltimore & Ohio R.R., Baltimore, $127,463; gravel surfacing 1 mi. SM-68-22, St. Mary's Co., to Southern Maryland Contg. Co., 20 East Lexington St., Baltimore, $9,544. Noted Sept. 4.

Maryland — State Roads Comn., Baltimore, bituminous concrete paving 1.2 mi. Contr. P-150-32, to Wm. P. MacDonald Contg. Co., 381 4th Ave., New York, $12,362 — penetration macadam resurfacing 0.9 mi. Contr. 140-34-34 to M. J. Grove Lime Co., Lime Kiln, $9,833—concrete shoulders 0.06 mi. Contr. P-141-32, to A. C. Conoway, Savage, $3,791, all foregoing in Prince George's Co., sheet asphalt paving 0.91 mi. Contr. BC-06-74 Baltimore City, to National Paving Co., Menlo Dr. and Western Maryland R.R., Baltimore, $70,221. Grand total $96,207. Noted Sept. 18.

Md., Baltimore—Bd. Awards, concrete paving 13,800 sq.yd. Contr. 560, to Arundel Contg. Co., 910 Trinity St., $29,362. Noted Sept. 4.

Massachusetts — Dpt. P. Wks., Boston, bituminous macadam paving 14,763 ft. Bridgewater and East Bridgewater, to Arute Bros., Inc., 499 South Main St., New Britain, Conn., $128,842. Noted Sept. 18.

Mass., Boston—Dpt. P. Wks., J. A. Rourke, comr., sheet asphalt paving Summer St., East Boston, to H. F. Malley, 95 Tyndale St., Roslindale, $44,635.

Mass., Boston—Dpt. P. Wks., sheet asphalt paving Adams St., to M. McInnis, 65 Pershing Rd., Jamaica Plain, $30,257.

Mass., Boston—Dpt. P. Wks., J. A. Rourke, comr., artificial stone sidewalks, Brantwood St., Brighton, to Baker Contg. Co., 1578 Tremont St. Est. $25,000.

Mass., Brookline (br. Boston)—Sheet asphalt paving Hammond St., to A. G. Tomasello & Son, Inc., 250 Stuart St., Boston. Est. $25,000.

Mass., Malden (br. Boston)—Warrenite bitulithic or equivalent paving 14,700 sq.yd. Cross, Bryant and Franklin Sts., separate contracts. Noted Sept. 11.

Mass., Newburyport — Bituminous macadam paving Merrimac, Purchase, Greenleaf and Water Sts., separate contracts, $100,000. A. Gillis, mayor, City Hall, in charge.

Mass., Salem—Bituminous macadam paving 2,830 sq.yd. Washington Sq., separate contracts. Address F. P. Morse, City Hall.

Mass., Salem—Widening, bituminous macadam paving Norman St., separate contracts. $25,000. J. P. Kelly, City Hall, supt. streets.

Mass., Swampscott—Town, M. J. Ryan, in charge, Town Hall, bituminous macadam repaving 1,450 ft. Ocean Ave., to M. McDonough Co., Bway., Malden, est. $25,000.

Mass., Swampscott — Bituminous macadam paving 2,125 ft. Bayview Dr., to M. McDonough Co., Bway., Malden. Est. $25,000.

Michigan — R. A. Beers, resident engineer, Kalamazoo, grading, shaping, draining, concrete paving 11.277 mi. FO80-4C-1, Van Buren Co., 20 ft., to Hersey Gravel Co., Hersey, for State Hy. Comn., Lansing. $742,770, incl. cement. Noted Aug. 14.

Michigan—R. A. Boers, resident engr., Kalamazoo, grading, shaping, concrete paving 1.688 mi. MO11-9C-2 and 5.563 mi. FO11-9-1, both Berrien Co., 20 ft., to Scharl Constr. Co., Grand Rapids, for State Hy. Dpt., Lansing. $63,398 and $254,843 respectively, both incl. cement.

Michigan—R. Beers, resident engr., Kalamazoo, grading, shaping, concrete paving 12.183 mi. FO11-30 Contr. 1, 20 ft., Berrien Co., to Lewis & Frisinger, Ann Harbor, for State Hy. Dpt., Lansing. $507,674. Noted Aug. 28.

Michigan—E. R. Benkert, resident engr., Port Huron, grading, 16,606 mi. MO77-4-Contr. 1 and 2 St. Clair Co., to T. E. Currie, 909 Transportation Bldg., Detroit, for State Hy. Dpt., Lansing. $100,180 incl. cement. Noted Aug. 28.

Michigan — E. R. Benkert, resident engr., Port Huron, grading, concrete paving 7.063 mi. FO32-36, Contr. 1, Huron Co., 20 ft., to Meredith & McVaugh, Warren, for State Hy. Dpt., Lansing, $198,712, incl. cement. Noted Aug. 28.

Michigan — E. R. Benkert, resident engr., Port Huron, grading, concrete paving 5.009 mi. FO44-25, Contr. 1, 20 ft., Lapeer Co., to T. McNally, Saginaw, for State Hy. Dpt., Lansing. $153,837, incl. cement. Noted Aug. 28.

Michigan — E. D. Crandall, resident engr., Cadillac, grading, two course graveling 13.811 mi. FO51-7, Contr. 1, Manistee Co., 21 ft., to C. Reger, Clare, for State Hy. Dpt., Lansing, $200,163, incl. cement. Noted Aug. 28.

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Michigan — H. C. Fleming, resident engr., Grand Rapids, grading, concrete paving 0.933 mi. FO70-20, Contr. 3, and 3.873 mi. Contr. 2, Ottawa Co., both 20 ft., to Barden & West, Zeeland, for State Hy. Comn., Lansing, $25,420 and $110,746 respectively, both incl. cement.

Michigan — H. C. Fleming, resident engr., Grand Rapids, grading, concrete paving 6.372 mi. MO59-24, Contr. 3, Montcalm Co., 20 ft., to Wolverine Asphalt Paving Co., Grand Rapids, for State Hy. Dpt., Lansing. $193,281, incl. cement. Noted Aug. 28.

Michigan —G. H. Greene, resident engr., Alpena, grading, concrete paving 4.166 mi. FO16-19, Contr. 1, Cheboygan Co., 20 ft., to R. R. Scott Co., Saginaw, for State Hy. Dpt., Lansing, $133,327, incl. cement. Noted Aug. 21.

Michigan—E. H. Haahr, Newberry, resident engr., grading, shaping, graveling 8.172 mi. MO75-22-Contr. 1, 18 ft., to Peterson Constr. Co., L'Anse for State Hy. Dpt., Lansing, $128,-339, incl. cement. Noted Aug. 14.

Minnesota—State Hy. Dpt., St. Paul, improving 8.5 mi. S.P. 9-40, and 17.3 mi. S.P. 70-21, to R. P. England, Amboy, $67,703 and $156,-987 respectively—10.1 mi. S.P. 20-37, Sect. 1, to C. Weaver, Anoka, Minn., $123,044—5.9 mi. S.P. 20-27, to J. P. O'Neill, Faribault, $40,001. Grand total $387,735. Noted Sept. 4.

Neb., Carter Lake—Grading, concrete paving 13th and Locust Sts., to J. Kerns Constr. Co., Union State Bank Bldg., Omaha, $67,000.

Neb., Du Bois—G. V. Allen, city clk., grading, tl in. rein.-con. paving 9,100 sq.yd. Miner St., to Abel Constr. Co., Lincoln, $23,377. Noted Aug. 28.

Neb., Omaha—Grading, curbing, concrete paving 23,608 sq.yd. Blondo St., to Yant Constr. Co., Omaha Natl. Bank Bldg., at $1.53 per sq.yd.

Nevada—Directors Dpt. Hys., Carson City, grading, graveling 11.7 mi. road from Austin to 12 Miles East, Route 2, Sects. D and E, to Utah Constr. Co., Ogden, Utah, $147,975. Noted Sept. 18.

Nevada — Directors Dpt. Hys., Carson City, asphaltic fuel oil with crushed graveling 11.65 mi. Eureka Co., to Basalt Rock Co., Napa, Calif., $30,388. Noted Sept. 5.

N. J., Bordentown — Sheet asphalt paving Union and Burlington Sts., to Malcolm Contg. Co., Garfield, $26,063.

N. J., Newark—Essex Co., Hall of Records Bldg., concrete curbing, bituminous concrete on 6 in. stone paving Mountain Ave., to Francisco Bros., Ridge Rd., Little Falls, $28,248.

N. J., Paterson—Passaic Co., Court House, grading, concrete paving Old High Mountain Rd., to R. S. Sowerbutt, 244 Highland Ave., $130,075.

N. J., Ridgefield Park—Bd. Village Comrs., 232 Main St., rein.-con. paving Industrial Ave., to Purdy-Hamilton Constr. Co., Inc., 16 West Fort Lee Rd., Bogota, $36,865.

N. J., Secaucus—Bd. Freeholders Hudson Co., Court House, Jersey City, reconstructing County Road Extension, to Clinton Asphalt Co., 308 16th St., Union City, $60,078. Noted Sept. 19 Daily.

New York—A. W. Brandt, comr. Hys., Albany, concrete paving 2.5 mi. Oneida Co., to D. L. Lewis Constr. Co., 122 Jay St., Schenectady, $129,278 est. $180,129—5.04 mi. Rensselaer Co., to Sheehan Contg. Co., 28-30 DeWitt St., Albany, $217,101 est. $296,471—4.48 mi. Otsego Co., to Stento & Sarafini, 60 Exchange St., Binghamton, $237,912 est. $319,355—8.8 mi. Yates Co., to J. Petrossi Co., 68 Main St., Rochester, $434,844 est. $611,327—4.14 mi. Columbia Co., to A. B. Bridges Sons, Inc., Hazardville, Conn., $163,344 est. $229,689—0.24 mi. Columbia Co., to A. Howard Constr. Co., Albany, $1,218 est. $12,000—5.93 mi. Nassau Co., to A. P. Scott Co., Inc., Jamaica, $198,841 est. $275,597—8.56 mi. Schenectady Co., to Madison County Constr. Co., Inc., Solsville, $331,106 est. $431,010 — grading 7.69 mi. Clinton Co., to B. R. L. Constr. Co., Inc., Syracuse, $141,283 est. $209,627—bituminous macadam paving 6.08 mi. Otsego Co., to P. L. Case, Rochester, $194,552 est. $282,738—Hy. 1888, Delaware Co., to F. A. Ursitti, Buffalo, $300,834 est. $659,619. Grand total $2,459,313. Noted Aug. 14 and 28.

N. Y., Albany—Bd. Contr. & Supply, City Hall, improving Colonie St., to E. V. Carey, 17 Erie St., $7,168—redressed granite block paving High St., and curbing Manning Blvd., to V. DiGiulio, 80 Madison Ave., $14,261 and $7,704 respectively—repaving roadway through Lincoln Park, to Sheehan Contg. Corp., 445 2nd St., $16,712—granite block repaving Montgomery and Park Sts., to H. Dumary, 30 Ontario St., $33,942 and $7,533 respectively—removing first parkway on New Scotland Ave., to T. S. O'Brien, Inc., 313 Delaware Ave., $1,285 — rein.-con. pipe culvert across Slingerland St., to B. Trimpoli, Schenectady, $1,695. Grand total $90,300. Noted Sept. 4 Daily.

N. Y., Albany—Albany Port Dist. Comn., laying 4,000 ft. hy. on city side port development, to E. V. Carey, 17 Erie St., $40,516. Noted Sept. 11.

N. Y., Brooklyn—H. Hesterberg, pres. Brooklyn Boro, Boro Hall, asphalt paving Himrod St. and Jefferson Ave., to D. J. McCoy Asphalt Co., Avenue U and East 57th St., $10,946 and $11,-318 respectively—Powell St. and Prospect Pl., to R. Turecamo Contg. Co., New Cropsey Lane, $44,099 and $20,998 respectively—Sackett St., to Cranford Co., 52 9th St., $49,848—Vermont St., to Carblock Paving Co., Stagg St., $12,693 —Waverly St., to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., $36,594 — grading Avenue N, to Grimm Contg. Co., 170 McKinley St., $5,114. Grand total $191,610. Noted Sept. 11.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., asphalt paving on Barnes Ave. $8,244; Barretto St. $11,278; East 172nd St., $6,328; granite paving East 243rd St. $11,813 —to Clay Contg. Co., 368 East 167th St., asphalt paving Westchester Ave. $26,674; McClellan St. $11,885; Roberts Ave. $16,573—to S. Nugent, 1617 73rd St., Brooklyn, grading Boyd Ave. $7,201—to F. Mascali & Son, 645 East Tremont Ave., Hobart Ave., $5,998—to A. Spadaro, 1718 Grand Ave., sewers in Bussing Ave., $14,245—to Anita Constr. Co., 410 200th St., Paine St., $1,360; Laconia Ave. $1,479. Grand total $122,978. Noted Sept. 11.

O., Canton — Stark Co., grading, concrete paving 1.92 mi. Akron St., to Cable Co., 1421 5th St. S. W., $35,379—3.427 mi. Mardindale Rd., 18 ft., to H. Wise, Alliance, $67,-164—1.87 mi. Rockhill Rd., 20 ft., to Urban Bros., Massillon, $29,055. Grand total $131,598.

O., Canton—W. C. Haubold, dir. P. Serv., brick on concrete paving 1 mi. Harrison Ave. S. W., 36 ft., to Garaux Bros. Co., 415 9th St. S. W., $86,121 est. $100,000; brick paving Sandal Pl. N. E. and Springs St., N. E., to W. F. Bair, 1132 Dueber Ave. S. W., $27,392 est. $25,000.

O., Cincinnati—Comrs. Hamilton Co., asphalt bound macadam repaving 6,000 sq.yd. Washington Rd., 16 ft., to A. M. Slone, Drake Rd., $20,877 est. $25,286; grading, curbing, concrete repaving 42,500 sq.yd. Foley Rd., to Wilmore Paving Co., Middletown, $129,647 est. $176,446. Noted Aug. 23.

Okla., Wewoka—E. Cooper, clk. Seminole Co., gravel surfacing 13 mi. Road 53, 18 ft., own forces. $30,000. Noted Sept. 4.

Okla., Wewoka—Seminole Co., concrete slab surfacing 1.5 mi. Konawa Rd. and 8.425 mi. Rd. 21, 18 ft., to Ward Beekman Co., 1801 East 9th St., Oklahoma City, $31,821 and $199,864 respectively. Est. $35,000 and $210,000 respectively.

Okla., Wewoka—Seminole Co., grading, Bates type concrete surfacing 8.425 mi. Project 21, Sects. E and F, State Hy. 48, to Ward-Beekman, Inc., 1801 East 9th St., Oklahoma City, $199,864.

Pa., Duquesne—Regrading, recurbing, repaving Hamilton Ave. and grading, curbing, sidewalks, sanitary sewer, retaining wall, paving North 1st St., to Davin Constr. Co., 911 Galveston Ave. N. S., Pittsburgh, $19,582 and $47,039 respectively.

Pa., Phila. — Dpt. P. Wks., Bureau Eng. & Surveys, A. Murdock, dir., City Hall, Annex, Schedule C, University Bridge Approach, over Schuylkill River at 34th St., east side of railroad, to McCabe Bros., Rock Hill Rd., Cynwyd, $64,322. Noted Aug. 28.

Pa., Waynesburg — K. W. Scott, city secy., Municipal Bldg., concrete slag surfacing 1,360 ft. East Lincoln St., 30 ft., to W. K. Reed, Waynesburg. Est. $25,000. Noted Aug. 14.

South Dakota—State Hy. Comn., Pierre, to Dowd Bros., Clark, grading 11.143 mi. Codington Co., $35,549; 13.641 mi. Roberts Co., $47,647—to A. F. Jarvis, Sioux Falls, 5.973 mi. Brown Co., $14,941; 9.803 mi. Buffalo Co., $51,618; 9.375 mi. Hutchinson-Hapson Counties, $22,436; 10.002 mi. Edmunds Co. $28,708—5.086 mi. Turner Co., $21,138—to G. W. Condon Co., Omaha, Neb., 19.659 mi. Dewey Co., $41,411 —to T. J. Tobin Constr. Co., Albuquerque, N. M., 4.652 mi. Pennington Co., $66,492—to S. T. Gustafson, Belle Fourche, 2.029 mi. Clay and Turner Counties, $6,764—to M. E. Lein Constr. Co., Veblen, 8.954 mi. Grant Co., $35,536 —to C. A. Wagner, Sioux Falls, graveling 16.872 mi. Brown Co. 023,872—to W. E. Knight, Webster, 14.533 mi. Campbell Co., $8,927; 7.388 mi. Codington Co., $4,687—to S. J. Groves & Sons Co., 306 Globe Bldg., Minneapolis, Minn., 5.334 mi. Butte Co., $13,372—to Van & Van, Hull, Ia., 13.746 mi. Walworth Co., $18,334—to T. E. Sheehan Constr. Co., Sioux Falls, 16.125 mi. Potter Co., $20,268; 8.231 mi. Hanson Co. $5,903—to Goble Constr. Co., Rapid City, 8.166 mi. Lawrence Co., $13,785—to W. E. Bartholow & Sons, Spencer, 11.827 mi. Hamlin Co., $11,788; 11 mi. Sanborn Co. $8,868—to G. W. England & Son, Murdo, 10.536 mi. Todd Co., $18,782—to J. L. Healy, Manchester, 17.918 mi. Douglas Co., $16,792; 6 mi. Douglas Co., $5,405—to Larson-Erling Co., Sioux Falls, 16.792 mi. Hamlin, Brookings and Kingsbury Counties, $22,535—to H. Miller, Hartley, Ia., 15.911 mi. Yankton Co., $30,479—to C. L. Yost, Bristow, Ia., 13.999 mi. Bon Homme Co., $18,480; 17 mi. Clark and Beadle Counties, $19,186—to Thiesen Bros., Osmond, Neb., 4.998 mi. Turner Co., $3,303—to M. Joyce, Brandon, 12 mi. Hutchinson Co., $9,807—to Summit Constr. Co., Summit, guard rail in Beadle Co., $374; Fall River Co., $1,798; Hutchinson Co., $2,304; Hanson and Hutchinson Counties; Codington Co., $1,416 Bennett Co. $1,084; Bay Co. $2,209. Grand total $660,417.

Tex., Liberty—Liberty Co., c/o C. R. Wilson, judge, grading, drainage structures, concrete paving 8.2 mi. Raywood-Rull Rd., 18 ft., to James Stanton & Son, Leavenworth, Kan., $181,000. Noted Sept. 18.

Washington—S. J. Humes, dir. Hys., Olympia, grading 5.31 mi. State Road 3, Kittitas Co., to Myers & Goulter, 184 Holgate St., Seattle, $232,-788. Noted Sept. 11.

W. Va., Beckley—Widening North Kanawha St., to J. H. Harvell, Beckley, $35,000.

Streets and Roads (Continued)

Wisconsin—State and Eau Claire, St. Croix and Trempealeau Counties Hy. Comns., Eau Claire, grading, bridging 167,667 cu.yd. Osseo-Eau Claire Rd., F.A.P. 368-C and D, to L. G. Arnold, Inc., Eau Claire. $62,998. Noted Sept. 11.

Wisconsin — State Hy. Comn. and Comrs. La Crosse Co., La Crosse, grading, concrete paving Black River Falls-Melrose Rd., to D. E. Button, Sparta, $2,815—crushed stone surfacing 6,000 cu.yd. Alma-Mondovi Rd., to Herbert Turner & Co., Wauzeka, $10,620—12,500 cu.yd. Hillsboro-Yuba Rd., to E. Kramer, Plain, $19,125. Grand total $32,560.

B. C., Vancouver — Concrete paving, to Harrison & Lamond, 615 Hastings St. W., $13,914—warrenite bitulithic paving, to Columbia Bitulithic Ltd., Granville Island, Vancouver, $11,016, and to Carter Halls-Aldinger Co., 310 Hastings St. W., $20,658. Grand total $45,588.

Ont., Brampton — Peel Co., County Bldg., bituminous macadam paving 3.25 mi., to Brennan Paving Co., Ltd., 400 Gage Ave. N., Hamilton. Est. $40,000.

Ont., Brampton—Town, concrete curbing, guttering, bitulithic on concrete paving 1 mi., to Storms Contg. Co. Ltd., Confederation Life Bldg., Toronto. Est. $40,000.

Ont., London—Concrete paving 1 mi. Logan and Highbury Aves., 36 ft., day labor. $50,000. W. P. Near, city engr.

Ont., Mimico — Town, asphalt and concrete paving Church St., to Lowes Constr. Co. Ltd., 79 Burlington Rd., $59,338.

Ont., St. Thomas—Concrete curbing, guttering Ross St., to Ponsford Constr. Co., 605 Talbot St., St. Thomas; asphalt paving, to Standard Paving Co., Central Chambers, Ottawa. Est. $25,000.

Ont., Stouffville — Toronto & York Roads Comn., 57 Adelaide St. E., Toronto, bitulithic paving 1.25 mi. roads, to Warren Bituminous Paving Co., 74 University Ave., Toronto. Est. $30,000.

Ont., Toronto — To McNamara Constr. Co. Ltd., 53 Yonge St., asphalt paving Glenlake Ave., $4,844—to Rayner Constr. Co. Ltd., 159 Bay St., Melita Ave., $9,361 — to Warren Bituminous Paving Co. Ltd., 74 University Ave., Balloil St. $10,903; Chaplin Crescent $5,991; Duplex St. $6,927. Grand total $38,026.

Ont., Toronto—City Council, to Constructing & Paving Co. Ltd., Confederation Life Bldg., asphalt paving Brookfield St., $3,900—to Kilmer & Barber Ltd., Harbor Comn. Bldg., asphalt paving Byron Ave., $3,630; Chatham Ave., $5,091; Sudbury Ave., $17,512—to Certified Constr. Co., 16 Endean Ave., brick block paving Sycamore Pl., $3,723. Grand total $33,856. Noted Sept. 5.

Ont., Toronto—City Council, asphalt paving Park Ave., to Kilmer & Barber Ltd., Harbor Comn. Bldg., $3,077—asphalt and brick block paving Dundurn Rd., to Godson Contg. Co. Ltd., 203 Richmond St. W., $11,870—bitulithic paving Hillsdale Ave. and Lascelles Blvd., $34,554 and $13,945 respectively. Grand total $63,446.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

PROPOSED WORK

Calif., Berkeley — Interests represented by R. L. Vaughn, engr., 461 Market St., San Francisco, developing entire river front, incl. wharves, slips, terminal facilities, dredging. $5,000,000-$8,000,000.

Calif., Los Angeles—Los Angeles Co. Flood Control spreading grounds on Big Dalton Wash at mouth Big Dalton Canyon, incl. 8,500 lin. ft. spreading ditches, seventy 8 in. pipe with head gate installed, 38 wet rubble masonry check dams, 3 lateral diversion structures. E. C. Eaton, Los Angeles, engr.

Kan., Madison—Preliminary surveys and report cleaning channel Verdigris River also levees. **Maturity this fall.** Emporia Eng. Co., 101 West 6th St., Emporia, engrs.

New Jersey—State Bd. Commerce & Navigation, State House, Trenton, stone jetties, timber bulkhead along ocean front from Sea Bright to Point Pleasant. $1,500,000. Private plans.

Ont., Brantford—Town Council, 1 mi. dyke. $100,000.

BIDS ASKED

Calif., Fair Oaks—Oct. 11, by Bd. Directors Fair Oaks Irrigation Dist., furnishing, delivering, laying 2,000 ft. 30 in. 8-ga. and 2,000 ft. 30 in. 10-ga. riveted or welded steel slip joint soil proof pipe line; furnishing, delivering 2,000 ft. 12 in. ga. welded or riveted steel slip joint pipe.

Illinois—Oct. 4, by Bd. Comrs. Union Drainage Dist. 1, towns of May and Taylorville, Christian Co., at Goodrich Schoolhouse near Taylorsville, cleaning out 12,711 ft. main ditch, lateral, short span, 7,762 cu.yd. excav. J. W. Dappert, Taylorsville, engr.

La., Bastrop—Oct. 14, by Police Jury Morehouse Parish, with roadbed drainage structures, Project 100, J. Lester, Bastrop, parish engr.

Pa., Phila.—See "Sewers."

Tex., Brownwood—Nov. 6, by Bd. Directors Brown Co. Water Impvt. Dist. 1, earthen reservoir dam, appurtenant works across Pecan Bayou, about 8 mi. from here. D. W. Ross, engr. district; adv. E. N.-R. Oct. 2.

Tex., Edinburg—Hidalgo Co. Water Impvt. Dist. 6, taking bids and open same Oct. 15, 400,000 sq.ft. canal lining, 36,100 ft. 12- to 30-in. underground pipe, 18 manholes, 44 meters, 31 vents, 3 pumps, 3 pump houses, for irrigation project. $300,000. Address Board.

Ont., Port Maitland—Oct. 3, by N. Desjardins, secy., Dpt. P. Wks., Ottawa, extending shore protection on west side harbor.

CONTRACTS AWARDED

Calif., Santa Barbara — City Council, East Cabrillo Blvd. wall or revetment, to Shannahan Bros., San Fernando Bldg., $85,000. Noted Aug. 14.

Ia., Des Moines—See "Sports and Parks."

La., New Orleans—Bd. State Engineers, New Orleans, Court Bldg., supplement work and repairs to bank protection, Cat Island Bend, Bossier Parish, Honore Bend Project, to E. L. McCain, Shreveport, $24,000. Noted Aug. 14.

Mass., Milton — Commonwealth of Massachusetts, 1 Ashburton Pl., Boston, drainage in Blue Hills Parkway, to J. P. Condon Corp., 10 Mt. Auburn St., Watertown, $15,175. Noted Sept. 11.

Mich., Detroit — H. W. Bush, comr. Dpt. Parks & Blvds., completing rein.-con. sea wall on pile and timber found., at Memorial Park, to Contractors, Inc., 12901 Lyndon Ave., $46,699. Noted Aug. 28.

Miss., Hattiesburg — City changing course Gordons Creek and putting down 5 in. rein.-con. on bottom and slopes, to E. E. Lowell, Prentiss, $14,660.

Miss., Ripley—Tippah Co., necessary drains, canals, in New West Hatchie and Owl Creek Drainage Dist., 135,000 cu.yd. excav. to Coleman Bros. and to Woolman Constr. Co., Saginaw, Mich. Noted Sept. 4.

Ont., Hamilton — Dominion Govt., Ottawa, dredging old and new channel in Hamilton Harbor, to R. C. Huffman Constr. Co., 331 Bay St., Toronto, $123,000.

Ont., Port Maitland — Dpt. P. Wks., Parliament Bldgs., Ottawa, reconstructing timber breakwater, to N. K. Cameron, 39 Pine St., Welland, and to D. E. Phin, 14 Elgin St. E., Welland, $29,820.

Ont., Toronto—Toronto Harbor Comrs., Harbor Commissioners Bldg., dredging south end Don Channel, to Russell Constr. Co. Ltd., Harbor Commissioners Bldg., Toronto, $26,708. Noted Mar. 13.

Public Bond Elections

Coming Bond Elections

Filtration Plant, etc.—Brawley, Calif., $180,000.
Waterworks, Dam, etc.—Santa Barbara, Calif., $2,100,000.
Waterworks Impvts.—Colchester, Ill., $70,000.
Waterworks, Sewers, etc. — Duluth, Minn., $2,000,000.
Waterworks — St. Paul, Minn., November, $500,000.
Waterworks Impvts.—Hobart, Okla., $400,000.
Waterworks—Grand Forks, N. D., November, $250,000.
Sewers—East Cleveland, O., Nov. 4, $67,000.
Sewage Disposal Plant—Kingfisher, Okla., Oct. 14, $25,000.
Sewerage System, Disposal Plant, Waterworks Impvts., Paving, etc.—Pt. Isabel, Tex., Oct. 4, $300,000.
Airport—Spokane, Wash., Nov. 4, $120,000.
Golf Course—Spokane, Wash., Nov. 4, $110,000.
Court House—Fresno County, Calif., $500,000.
Terminal and Passenger Station—Multnomah County, Ore., $1,250,000.
Court House and Jail—Colutta, Tex., La Salle County, Oct. 18, $150,000.

Bonds Defeated

Waterworks Dam, Filtration Plant, etc. — Osceola, Ia., $50,000.
Waterworks—Liberal, Mo., $43,000.
Schools—St. Louis Park, Minn., $250,000.

FEDERAL GOVERNMENT

PROPOSED WORK

California—ROAD—C. H. Sweetser, dist. engr. Pub. Rds., 461 Market St., San Francisco, (last unit) 4 mi. Wawona Rd., incl. 1 mi. tunnel. $750,000.

Calif., Long Beach—REPAIRING—U. S. Eng., Los Angeles, 3,000 ft. Long Beach Breakwater.

Calif., Pomona—FEDERAL—Treas. Dpt. at office Sup. Archt., 2 story, steel, rein.-con. federal building, Thomas St. between 4th and 5th Sts.

Idaho—CANAL—U. S. Reclamation Service, Denver, Colo., 3.5 mi. Milner-Shoshone Canal between Little Wood and Big Woods Rivers, American Falls Reservoir Dist. 2, near Gooding. E. B. Darlington, Burley, dist. engr.

Mass., Winthrop—HOSPITAL—Con. Q. M. Fort Banks, 2 story hospital, at Fort Banks.

Ore., Portland—DIKES—U. S. Eng. 1,550 lin. ft. pile dikes in Columbia River.

Pa., Phila.—DREDGING—U. S. Eng. 808,000 cu.yd. in Phila. harbor.

T. H., Honolulu—DREDGING—U. S. Eng. reserved channel.

BIDS ASKED

Calif., San Francisco—CONCRETE LANDINGS, etc.—Oct. 20 by Superintendent of Lighthouses, grading, rock excav., concrete landings, concrete stairways, rein.-con., retaining walls, water tanks, roadways, concrete rainshed and installing pipe lines, water tanks, hoisting derricks, etc.; adv. E.N.-R. Oct. 2.

California—ROAD—Oct. 21, by C. H. Sweetser, dist. engr. Pub. Rds., 461 Market St., San Francisco, clearing, grading 3.697 mi. Sect. A-5, Route 2, Wawona Route and Sect. B-2, Route 1, South Road, Yosemite Natl. Park Hy., Mariposa Co.

D. C., Wash.—BAR COPPER, etc.—Oct. 14, by A. L. Flint, genl. purch. agt. Panama Canal, bar copper, phosphor bronze wire, anvils, boat nails, pipe dies, drills, expansion bits, ship augers, pipe cutters, and parts, Schedule 2596.

D. C., Wash.—BOILERS—Oct. 28, by Con. Q. M., additional boiler installation in heating plant, at Army Medical Center; adv. E. N.-R. Oct. 2.

D. C., Wash.—ROCK-CRUSHING PLANT—Oct. 15, by A. L. Flint, genl. purch. agt. Panama Canal, rock-crushing plant, power drag scraper, automobiles, trucks, grinding machine, dies, etc., Schedule 2594.

Florida—DIKE—Oct. 17, by U. S. Eng., Jacksonville, 22,450 cu.yd. fill on dike south of Moss Bluff Dam, Oklawaha River.

Idaho—PUMP, etc.—Oct. 31, at office Bureau Reclamation, Denver, Colo., 1 pump having capacity 180 second ft. when operating under head of 31 ft., one 800 hp., 2,200 volt, 3-phase, 60 cycle, synchronous motor and auxiliary and control apparatus, for Pumping Station 1, Minidoka Project; adv. E. N.-R. Oct. 2.

Ind., Lafayette—POST OFFICE—Oct. 17, by Treas. Dpt. at office Sup. Archt., post office. Noted Sept. 25.

Mass., Amesbury — RETAINING WALL — Treas. Dpt. at office Sup. Archt., taking bids repairing retaining wall, U. S. Post Office.

Mass., Pittsfield—HOSE and COUPLINGS—Oct. 21, by Dpt. Agriculture, 20,000 ft. rubber covered spray hose, hose couplings.

Mass., Vineyard Haven—HOSPITAL—Treas. Dpt. at office Superv. Archt., taking bids repairing and changes to attendants' quarters, U. S. Marine Hospital.

Miss., Gulfport—WARD, etc.—Vet. Bur., bids about Oct. 10, ward building, medical officer's quarters, altering kitchen and dining room, nurses' home, theatre, at U. S. Veteran's Hospital.

Mo., Cape Girardeau—EARTHWORK—Oct. 14, by U. S. Eng., Memphis, Tenn., 1,960,000 cu.yd. earthwork in Little River D.D., near here.

N. Y., Brooklyn—CABLE—Oct. 15, by Signal Supply Officer, Sig. Sect., New York General Depot, 58th St. and 1st Ave., cable and reels.

N. Y., Brooklyn—WIRE—Oct. 14, by Signal Supply Officer, Signal Sect., New York General Depot, 58th St. and 1st Ave., wire.

Tex., Randolph Field—QUARTERS—Oct. 20, by Con. Q. M., constructing bachelor officers' quarters and mess, post exchange and service station; adv. E. N.-R. Oct. 2. Noted Aug. 28.

Tex., Randolph Field—TELEPHONE CONDUIT—Oct. 24, by Signal Officer, underground telephone conduit system, incl. 87 manholes, 19,605 lin.ft. clay duct, 38,500 lin.ft. creosoted wood duct, 38 fire telephone supports.

Wash. Fort Lewis—QUARTERS—Oct. 14, by Con. Q.M., 4 officers quarters; adv. E.N.-R. Oct. 2.

CONTRACTS AWARDED

California—DREDGING—U. S. Eng., Calif. Fruit Building, Sacramento, New York Slough, to Hydraulic Dredging Co., Oakland, $74,000. Noted Aug. 7.

Ga., Savannah—SHORE PROTECTION WORK—U. S. Eng. steel sheet pile, creosoted timber shore protection work on east shore of Fort Screven Reservation on Tybee Island, to MacDougald Constr. Co., 289½ Peachtree St., Atlanta. Noted Aug. 21.

Mass., Charlestown—MARINE RAILWAY—Yards & Docks, Navy Dpt., repairing marine railway, to Crandall Eng. Co., 134 Main St., Cambridge. Est. $15,000.

Okla., Tulsa—POST OFFICE—Treas. Dpt. at office Sup. Archt., general contract remodeling, extending post office, 3rd and Boulder Sts., to C. Weitz & Son, 713 Mulberry St., Des Moines, Ia., $632,800. Noted Aug. 21.

R. I., Melville—POWER PLANT EQUIPMENT—Spec. 5715—Yards & Docks, power plant equipment, to Industrial Heating & Eng. Co., 490 Bway., New York.

R. I., Newport—POST OFFICE, etc.—Treas. Dpt. at office Sup. Archt., general contract altering post office and court house, Thames St., to E. E. Garber & Co., 203 West 4th St., Bethlehem, Pa.; heating and plumbing, to R. P. Wilson, Jr., Newport; electrical work, to Bardsley-Riley Electric Co., Newport.

RAILWAYS

PROPOSED WORK

Colorado and New Mexico—New Mexico Lumber Co., c/o J. Zallaha, Durango, 15 mi. railroad from McPhee, Colo. to lumber lands in New Mexico. $200,000.

Ontario—Toronto Transportation Comn., 35 Yonge St., Toronto, extending double electric street car railway ¾-1 mi. from present terminus into center Canadian National Exhibition grounds. $100,000. W. E. P. Duncan, 35 Yonge St., Toronto, engr.

Quebec—Montreal Tramways, P. Sourot, ch. engr. Rapid Transit Div., tram lines on Montreal Harbor Bridge, Montreal. $250,000.

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SUBWAYS AND TUNNELS

PROPOSED WORK

Calif., Los Angeles—City appropriated $50,000, 300 ft. subway under Santa Monica Blvd. at Sawtelle.

BIDS ASKED

New York—Oct. 7, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, land and river borings, the Narrows Vehicular Tunnel, approaches, in Narrows, and Brooklyn and Richmond Boros. Agreement "JQ." Noted Sept. 25.

N. Y., New York—Oct. 7, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., railroad duct line, Routes 101 and 102 for Independent System City-Owned Rapid Transit Railroads, and sewer in Fulton St. Former bids rejected. Noted Aug. 28.

CONTRACTS AWARDED

N. Y., New York—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, altering railroad structure to permit widening roadway for Mott Ave., to Clay Contg. & Building Co., 369 East 167th St., $71,602. Noted Sept. 11.

N. Y., New York—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., installing tracks and other work for part 14th Street-Eastern Rapid Transit R.R., Route 7, Sect. 1-A, to McElroy & Kerwin, Inc., 370 Lexington Ave., $29,978. Noted Sept. 11.

GRADE CROSSINGS

PROPOSED WORK

California—See "Bridges."

BIDS ASKED

N. Y., Pleasantville—Oct. 15, at office Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, stone face rein.-con. concrete undercrossing, Ossining and Manville Rds., Saw Mill River Parkway. J. Downer, ch. engr.; adv. E. N.-R. Oct. 2.

CONTRACTS AWARDED

N. J., Beaver Lake—State Hy. Comn., Trenton, and Erie R.R. Co., G. S. Fanning, ch. engr., 50 Church St., New York, eliminating grade crossing by constructing bridge over tracks on Route 23, to Fuller Constr. Co., Red Bank, $37,216.

Okla., Oklahoma City—Chicago, Rock Island & Pacific R.R. Co., La Salle St. Sta., Chicago, Ill., W. H. Peterson, ch. engr., and St. Louis San Francisco R.R. Co., Frisco Bldg., St. Louis, Mo., F. G. Jonah, ch. engr., rein.-con. subway to carry Walker Avenue over ten tracks, to Fox Constr. Co., El Reno, $200,000.

Ont., Waterford — Dpt. P. Hys., Parliament Bldgs., Toronto, concrete, steel overhead crossing over Michigan Central Ry., on Provincial Hy., near here, to Grant Bros. Constr. Co. Ltd., 354 Bank St., Ottawa. Est. $160,000.

DAMS

PROPOSED WORK

Mass., Shutesbury—See "Waterworks."

BIDS ASKED

Tex., Brownwood—See "Excavation, Drainage, Irrigation, Levees, River and Harbor."

CONTRACTS AWARDED

Ark., Lake Village—Bd. Directors Chicot County Drainage Dist., c/o Secretary, earth dam ditch across Ditch Bayou, incl. 1,550 ft. 6 x 12 in. timber piles furnished and driven, 11,000 cu.yd. excav., to J. M. Lile & Son, Mansfield, $5,671. Noted Aug. 14, under "Village Lake."

PIERS AND WHARVES

PROPOSED WORK

Calif., Berkeley—WHARVES—See "Excavation, Drainage, Irrigation, Levees, River and Harbor."

CONTRACTS AWARDED

La., New Orleans — WHARVES — Bd. Port Comrs., furnishing, erecting structural steel framing for Mandeville St. Wharf, incl. 1,100 tons structural steel, to Louisiana Erecting Co., New Orleans, $76,703; Bienville St. Wharf, 810 tons structural steel, to Virginia Bridge & Iron Wks., Whitney Bldg., $61,317; 300 creosoted pilings for Mandeville, Charbonnet and Poland St. Wharves, to American Creosoted Wks., 1305 Dublin St., $13,872. Grand total $151,892.

Ont., Midland — WHARF — Dpt. P. Wks., Parliament Bldgs., Ottawa, reconstructing concrete, timber wharf, to Rayner Constr. Co. Ltd., 159 Bay St., Toronto, $56,152.

AIRPORTS

CONTRACTS AWARDED

Conn., East Hartford (br. Hartford)—Pratt & Whitney Aircraft Corp., 450 Capitol Ave., Hartford, and Chance Vought Corp., 120 Bway., New York, developing 165 acres, for airport, to C. C. Kilby, Inc., 1 Wawarme Ave., Hartford, $40,000; constructing 2 brick, steel hangars, to Bartlett Brianerd Co., 252 Asylum St., Hartford, $148,000. Noted Sept. 18.

Mo., Bridgeton—Bd. P. Serv., 300 City Hall, St. Louis, 3rd runway, 1,720 ft. long, at St. Louis Municipal Flying Field, to Bridges Asphalt Paving Co., 1411 Central Industrial St., St. Louis; and taxi strip, drainage, to Martin & Reilly, 7227 Lindell Blvd., St. Louis. Est. $54,000.

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GRAIN ELEVATORS

CONTRACTS AWARDED

Sask., Saskatoon—GRAIN ELEVATOR—Dpt. P. Wks., Ottawa, Ont., 168 x 192 ft. grain elevator addition, 90 ft. high, rein.-con, 11th St. W., to Bennet & White, 1116 9th Ave. W., Calgary, Alta., $600,000.

POWER AND LIGHTING

PROPOSED WORK

Mont., Shelby — Great Northern Securities Corp., R. O. McPhillips, local mgr., power transmission line from Shelby to cut bank, $60,000.

N. J., Union City—Bd. City Comrs., City Hall, modern traffic lighting system on Bergenline and Summit Aves. $50,000. H. Thourot, city engr.

Oklahoma—Pioneer Gas Utilities Co., 2218 North Eastern St., Oklahoma City, 9 mi. 4 in. gas pipe line from Choctaw to Jones, and gas distribution system in Jones, $25,000. Private plans.

BIDS ASKED

Kentucky and Ohio — See "Contracts Awarded."

Missouri—See "Contracts Awarded."

Okla., Seminole — City in market electric traffic signals. J. N. Harber, mayor.

CONTRACTS AWARDED

Kentucky and Ohio—Louisville Gas & Electric Co., 311 West Chestnut St., Louisville, Ky., 82 mi. 40,000 kw. 132,000 voltage high tension power line transmitting power generated by hydro plant at Louisville, Ky., to Cincinnati, O., three 18,750 kw. transformers to be installed at Louisville plant, own forces. $1,000,000. Work started. L. S. Streng, vice-pres., e/o owner, in charge.

Missouri—Missouri Power & Light Co., 740 Bd. of Trade Bldg., Kansas City, will construct electric transmission line from Brookfield to Utica and connecting line to Trenton, own forces. Private plans.

N. Y., Binghamton — Commissioner Dpt. Mental Hygiene, State Office Bldg., Albany, new transformers, cables, Binghamton State Hospital, to T. H. Green Electric Co., Inc., 31 East Water St., Rochester, $14,677. Noted Aug. 28.

N. Y., New York—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., station and tunnel lighting for Independent System City-Owned Rapid Transit Railroads, to Lord Electric Co., 105 West 40th St., $126,000; station finish for Nassau Ave., Greenpoint Ave., Van Alst St., 21st St. and Court Sq. Station Subway, to C. Meads & Co., 217 West 14th St., $342,588. Noted Aug. 14.

Ore., Hood River—City, hydro-electric system, distributing system, to J. C. Roberts, Spokane, Wash., $25,985; power house and wiring, to Apple City Electric Co., Hood River, $1,943; generator and voltage regulator, to Pelton Water Wheel Co., 2929 19th St., San Francisco, Calif., $5,229. Grand total $33,156.

SPORTS AND PARKS

PROPOSED WORK

Calif., Monterey—Monterey Union High School Dist., rein.-con., tile, open air swimming pool (filtering system). $20,000. Swartz & Ryland, Spazier Bldg., archts.

N. J., Highland Park—Bd. Educ., municipal playground, adjoining Franklin Junior High School. $65,000.

N. J., Long Branch—T. H. Beringer & W. Steinbach, 527 Bangs Ave., Asbury Park, sketches by Warren & Wetmore, 16 East 47th St., New York, brick, timber bath houses, Ocean Front. $150,000 or more.

N. J., New Brunswick—Bd. City Comrs., City Hall, preliminary plans stadium, field house. $25,000. A. Atkinson, city engr.

N. Y., Freeport — Bd. Village Trustees, athletic field, stadium, southeast section. $68,000 voted.

N. Y., New York—Beth Israel Hospital, 60 Jefferson St., bids early in November, swimming pool, elevators, and stairways in hospital, 60 Jefferson St. $150,000. H. Hurwitz, 41 West 33rd St., archt. Noted Sept. 18.

BIDS ASKED

N. Y., New York—Oct. 7, by Park Bd., W. R. Herrick, pres., Park Dpt., Arsenal Bldg., artificial granite concrete benches, in Isham Park; rebuilding upper portion crib bulkhead fence, etc. along waterfront Thomas Jefferson Park between 111th and 114th Sts.; installing wading pool, appurtenances in St. Gabriels Park.

O., Cleveland—Oct. 15, by City, D. E. Morgan, city mgr., superstructure 2 story, rein.-con., masonry stadium, Lakefront. $1,000,000. Osborn Eng. Co., 7016 Euclid Ave., archts. and engrs.

CONTRACTS AWARDED

Ia., Des Moines—City c/o J. A. Homborg, city clk., developing Birdland Drive Project in Union Park, incl. dredging lagoon, grading roads, drives, recreation area, bridges, to Union Constr. Co., 2nd St. and New York Aves., $80,000.

Ont., Kitchener—City general contract 75 x 190 ft. concrete swimming pool, incl. concrete tank, concrete walks, to Ball Bros., 33 King St. E.; excavating, to Seigmiller Bros., 1228 King St. E. Est. $27,000.

HEATING AND VENTILATING

PROPOSED WORK

Ont., Toronto—St. James Cathedral, Church and King Sts., new heating and ventilating systems, incl. fans, unit ventilators, motors, duct work, 120 hp. boiler in church. $25,000. McMaster-Jacob Eng. Co., 900 Bay St., engrs.

CONTRACTS AWARDED

Mass., Everett—City, M. C. O'Neil, mayor, City Hall, electrical work in hospital, Garland St., to Kenworthy & Taylor, 407 Bway., est. $25,000; heating and plumbing, to G. C. Torngren, 712 Bway., est. exceeds $25,000. Noted Sept. 11 under "Hospitals."

Mass., North Adams—Commonwealth of Massachusetts, Armories Div., State House, Boston, heating in State Armory, Ashland and Porter Sts., to A. A. Wood, 103 Holden St.; plumbing, to Porter & Hadfield, 88½ Main St.; electrical work, to Isbell Electric Co., 92 Main St. Est. $25,000. Noted Sept. 18 under "Public."

Mich., Detroit—Detroit House of Correction, Alfred St., underground conduit and steam service in connection with men's new prison, to Wm. H. Pierce Co., 400 Penobscot Bldg., $25,570.

Mo., Jefferson City—Lincoln University, State College for Negroes, I. C. Tull, bus. mgr., heating for Home Economics and Education Buildings, to Judd Plumbing & Heating Co., 4400 East 15th St., Kansas City, $23,281; plumbing, to J. L. Crum, Columbia, $37,000; electrical wiring to P. F. Steppleman Electric Co., 117 West High St., $8,099. Grand total $68,380. Noted Sept. 18 under "Schools."

N. Y., Newark—Dpt. Mental Hygiene, State Office Bldg., Albany, equipment for dining room and service building, at Newark State School, to Arkay Co., 335 West 16th St., New York, $20,584; sanitary work for service building, to Hickey Bros., 256 North Union St., Olean, $1,421; shop building, to Felton Constr. Co., 1450 Michigan Ave., Buffalo, $20,768. Grand total $42,773. Noted Aug. 21.

R. I., Pawtucket—City, W. A. Newell, supt. schools, heating in Junior High School, Newport Ave., to Lincoln & Lane, 30 Bayley St., $54,763; electrical work, to New England Machine & Electric Co., 77 Baley St., $21,313; plumbing, to F. Dupuis Co., 599 Main St., $16,142. Grand total $92,218. Noted July 24 under "Schools."

UNCLASSIFIED

PROPOSED WORK

Oklahoma and Kansas—OIL PIPE LINE—Sinclair Oil & Petroleum Co., 45 Nassau St., New York, 110 ft. 12 in. oil pipe line from Oklahoma City, Okla., oil fields to Sinclair Refinery, Coffeyville, Kan. $1,000,000.

Ont., Chalk River—Canadian Pacific Ry., J. M. Fairbairn, ch. engr., Windsor Sta., Montreal, Que. 200 ton circular coal storage, coaling plant, elevating equipment. $35,000.

Ont., Toronto—CAR BARNS—Toronto Transportation Comn., 35 Yonge St., 1 story, steel, concrete car barns, in Runnymede Dist. $740,000. W. E. P. Duncan, 35 Yonge St., ch. engr.

BIDS ASKED

Ind., Indianapolis—TRANSFORMER ROOM—Oct. 21, at office Trustees Indiana World War Memorial, Indiana World War Memorial Bldg., St. Clair and Meridian Sts., transformer and switchboard room, grading, paving, electrical, plumbing work, etc. $25,000. Walker & Weeks, 2341 Carnegie Ave., Cleveland, O., archts.

N. Y., Long Island City—STATION FINISH WORK—Oct. 7, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, station finish work in Queens Plaza, 36th, Steinway and 46th Streets Stations of Rapid Transit R.R.

CONTRACTS AWARDED

Colo., Pueblo—TELEPHONE LINES and CONDUITS—Mountain States Telephone & Telegraph Co., c/o C. T. Hopkins, 221 West 4th St., line and conduit improvements. Owner builds. $44,370 appropriated for same.

Ont., Belleville—TANKS—British American Oil Co., Royal Bank Bldg., Toronto, four 400,000 gal. gasoline storage tanks, on concrete found., to E. F. Rutherford, 54 Alexander St. Est. $25,000.

MATERIALS

BIDS ASKED

READY MIXED CONCRETE—**Florida**—Oct. 6, by State Rd. Dpt., Tallahassee, R. Bentley, chn., 3,148 cu.yd. ready mixed concrete delivered to its place in road bed Project 884, Rd. 3, Duval Co.; alternate bids on 2,949 tons Macasphalt or Kentucky rock asphalt; 800 tons cold mix binder course, f.o.b. cars Broward, on the Seaboard. B. M. Duncan, state hy. engr.

PAVING MATERIALS—Chicago, Ill.—Oct. 6, by City, Dpt. P. Wks., City Hall, cold-lay paving materials for Roosevelt Road Viaduct. R. W. Wolfe, comr.

Materials (Continued)

STRUCTURAL STEEL—Chicago, Ill.—Oct. 7, by City, Dpt. P. Wks., City Hall, furnishing, fabricating, delivering structural steel for boiler platforms at William Hale Thompson Pumping Station, 49th St. and Western Ave. R. W. Wolfe, comr.

BRIDGE PLANK—Mt. Pleasant, Ia.—Oct. 7, at office Auditor Henry Co., 100,000 ft. 3 in. x 12 in. x 16 ft. standard sawn fir bridge plank.

CEMENT—Mississippi—Oct. 13, by State Hy. Comn., Jackson, 250,000 bbl. portland cement, f.o.b. various points, freight prepaid, for state highways during 12 months period. C. M. Williamson, dir.

GRAVEL—Wathall, Miss.—Oct. 6, by Bd. Comrs. Separate Road Dist. A. Webster Co., at office Chancery Clerk, 35,775 tons washed gravel, f.o.b. Maben, Mathiston, Europa and Tommolen; 12,670 tons washed gravel in Mantee and Dancy Separate Road Dist.

CONTRACTS AWARDED

DOUGLAS FIR, etc.—Boston, Mass.—Transit Dpt., 1 Beacon St., Douglas fir and long leaf yellow pine, to Geo. McQuesten Co., 422 Border St., East Boston, $8,085 and $14,490 respectively.

GRAVEL, etc.—Salem, N. J.—Bd. Freeholders Salem Co., Court House, 25,000 cu.yd. gravel and borrow for Pointer-Sharptown Rd., to J. W. Powell, Salem, $14,227.

EQUIPMENT

BIDS ASKED

HOIST—Alton, Ill.—H. C. Blaske, Alton, in market gasoline or electric single drum hoist.

LABORATORY EQUIPMENT—Mississippi—Oct. 13, by State Hy. Comn., complete laboratory equipment for testing laboratory, f.o.b. Jackson, testing machine, set of automotive beam and speed regulator cones, 500 k.g. cement testing machine, vicat cement consistency tester, 2 three-gang moulds, triple beam balance of 110 gram capacity, cement fineness balance, cement sampler, cement immersion pan, 2 La Chatelier specific gravity bottles, set standard Tyler sieves, incl. drying oven, cement mixing plate, measures, cylinder moulds, self registering thermometer. C. M. Williamson, dir.

BRAKE SHOES—St. Louis, Mo.—Oct. 10, by W. A. Hopkins, genl. purch. agt. Missouri Pacific R.R., 1002 Missouri Pacific Bldg., brakes shoes to be ordered as needed during 4th quarter of 1930; Driver R and L, and center hung ARA freight car, special chilled steeled back brake shoes, unflanged brake shoes for gas-electric motor cars.

Buildings

RESIDENTIAL

BIDS ASKED

Ark., Jonesboro—Hotel Noble, C. Noble, mgr., bids about Jan. 1, 4 story, basement, roof garden, 90 x 112 ft., rein.-con., brick, cut stone hotel addition, $200,000. E. W. Mann, 263 Cotton Exch., Memphis, Tenn., archt.

Calif., Stockton—G. Allen, archt., 41 South Sutter St., taking bids 5 story hotel annex, Sutter and Market Sts., for W. C. Clark, Clark Hotel. $200,000.

Mass., Boston—See "Contracts Awarded."

Mo., St. Louis—See "Contracts Awarded."

N. J., North Bergen — See "Contracts Awarded."

N. J., Union City—See "Contracts Awarded."

N. Y., Bayside—D. Noble, 160-16 Jamaica Ave., Jamaica, bids on general and separate contracts in summer, apartments, 47th and West Bell Aves. $150,000. H. Bruckner, 2424 Myrtle Ave., Ridgeway, archt. Noted Dec. 19, 1929.

N. Y., Long Beach — J. Manowitz bids in spring, general contract 6 story, 100 x 150 ft. brick, timber apartment hotel, Bway. and Magnolia Blvd. $400,000. H. Hurwitt, 41 West 33rd St., New York, archt. Noted Dec. 26, 1929.

N. Y., New York—See "Contracts Awarded."

N. Y., New York — Andrus Holding Corp., 1431 Bway., bids in March, general and separate contracts 9 story, 527 East 85th St. $350,000. Sugarman & Berger, 345 Madison Ave., archts. Noted May 8.

N. Y., New York—Four Hundred Fifty West End Avenue Corp., 230 Park Ave., soon takes bids on separate contracts 18 story, 448 West End Ave. $600,000. Boak & Paris, 11 West 42nd St., archts.

N. Y., New York — One Thousand Two Hundred Seventy-One Lexington Ave., bids in spring, general and separate contracts 36 story, 87 x 122 ft., brick, steel hotel, 60 East 83rd St. $1,750,000. Gronenberg & Leuchtag, 1385 Bway., archts. Noted May 16, 1929.

N. Y., Yonkers—Winton Ownership Plan, 565 5th Ave., New York, taking bids on separate contracts 6 story, 55 x 143 ft. apartments, Tuckahoe Rd. $200,000. E. S. Turner, 132 Lincoln Ave., archt.

Tenn., Union City—Group business men soon takes bids 5 story, 80 room, brick, concrete, 1st St. $200,000. A. P. Hansen, Shrine Bldg., Memphis, archt.

CONTRACTS AWARDED

Ark., Batesville—Local Syndicate, c/o Petter & McAninch, archts., Pyramid Life Bldg., Little Rock, 6 story, basement, 100 x 150 ft., brick, rein.-con., stone hotel, to George H. Burden Co., Moore & Turner, Bldg., Little Rock. Est. $200,000. Noted under "Contracts Awarded" Jan. 2.

Calif., Los Angeles — E. Bergman, 7 story, basement, rein.-con., South Gramarcy Pl., to Harris-Walsh Constr. Co., I. W. Hellman Bldg., $200,000.

Calif., Los Angeles — D. M. Edmunds, 407 North Orange Dr., 8 story, basement, rein.-con., Argyle Ave., to P. Elvad, 6231 Afton Pl., $500,000.

Calif., Los Angeles—W. F. Normandy, 622 Subway Terminal Bldg., 7 story, basement, rein.-con., Fernwood Ave., to Harris-Bowers Co., 313 I. W. Hellman Bldg., $200,000.

Calif., Santa Barbara—F. Bartholemew, et al., part 2 and 3 story, timber, stucco, East Blvd., to C. Thorn, 5615 West 4th St., Los Angeles, $195,000.

Conn., Bridgeport—W. F. Chatlos, Broad St., Stratford, 3 story, 180 x 230 ft., brick, steel, Main St. $350,000. Owner builds. J. W. Northrop, 211 State St., archt.

Mass., Boston—Owner, c/o E. Henderson, 8 Newbury St., 9 story, basement, brick, steel, plain found., Beacon and Exeter Sts., day labor by E. R. Boyle, consult. engr., 129 Newbury St. Est. exceeds $150,000.

N. J., North Bergen—G. Bove, 138 Columbia Ave., 3 story, basement, brick, steel, 185-87 Grand Ave. separate contracts, $150,000. B. Singer, 921 Bergen Ave., Jersey City, archt.

Mo., St. Louis—Arsenal-Watson Co., 4240 South Kinshighway, two 3 story, basement, 17 x 83 ft., rein.-con., brick, 4061-71 Gravois Ave., separate contracts. $150,000.

Mo., St. Louis—Paramount Constr. Co., 8th and Chestnut Sts., 3 story, basement, 60 x 80 ft., rein.-con., brick, 4417 Forest Park Ave., separate contracts. O. J. Popp, Arcade Bldg., archt.

N. J., North Bergen—R. Rinaldi, 516 Robinson St., 5 story, basement, brick, steel, Blvd. E. between 30th and 31st Sts., separate contracts. $150,000. E. Buehler, 164 East 38th St., New York, archt.

N. J., North Bergen — R. D. Vinik, 3988 Hudson Blvd., Union City, 3 story, basement, brick, steel, 1243-45 2nd Ave., separate contracts, $150,000. B. Singer, 921 Bergen Ave., Jersey City, archt.

N. J., Union City — H. Brustin, 1226 1st Ave., North Bergen, 3 story, basement, 75 x 100 ft., brick, steel, 3rd and Palisades Aves., separate contracts. $150,000. B. Singer, 921 Bergen Ave., Jersey City, archt. Owner requests separate contract bids.

N. Y., New York—Haren Riverside Corp., S. Gettenberg, pres., 391 East 149th St., 6 story, 150 x 150 ft., 175th St. and Prospect Ave., separate contracts. $475,000. H. I. Feldman, 15 West 44th St., archt.

N. Y., New York—Julliard Musical Foundation, 120 Claremont Ave., 4 story school, to Jacobs & Younge, 116 West 32nd St. Est. $800,000. Noted Sept. 25.

N. Y., New York—One Hundred Forty East 40th Street Corp., F. A. Parker, pres., 119 West 57th St., 12 story, 138 East 40th St., separate contracts. $400,000. Bien & Prince, 415 Lexington Ave., archts.

N. Y., New York—Rayan Building Co., 1710 Montgomery St., S. Dorfner, pres., apartments, separate contracts. $800,000. Architect not selected.

N. Y., New York—Village Apartments, Inc., M. Natanson, pres., 527 5th Ave., 19 story, 96 x 126 ft. apartments, 116 7th Ave. and 73 Christopher St., separate contracts. $1,000,000. Van Wart & Wein, 347 Madison Ave., archts.

N. Y., Yonkers — Winton Ownership Plan, Inc., 565 5th Ave., New York, 6 story, apartments, Algonquin Ave., separate contracts. $175,000. E. S. Turner, 132 Lincoln Ave., Tuckahoe, archt.

N. Y., South Fallsburg—Moneka Lodge, M. Karp, proprietor, general contract 3 story, basement, 40 x 170 ft., brick, steel, stucco hotel, plain found., to Heinie Kernoff, 172 Hope Ave., Passaic. Est. $150,000.

N. Y., St. George — W. B. Hill, c/o M. S. Diamond, archt., 25 Hyatt St., St. George, general contract 6 story, basement apartment, Tompkins Circle and Fiedler Ave., to Pfeifer Bros., 36 Richmond Terrace, St. George. Est. $150,000 or more.

Okla., Chickasha — General Hotel Corp., 8 and 10 story, basement, 165 x 165 ft., rein.-con., brick, steel, stone, 5th St. and Kansas Ave., to C. H. Sikes, 1008 South 16th St. Est. $500,000.

CLUBS

PROPOSED WORK

N. Y., Scarsdale—Saxonshire Country Club, c/o W. S. Phillips, archt., 521 5th Ave., New York, bids in spring, club house, landscaping, Stables in course of construction. Noted Mar. 27.

N. C., Charlotte—Charlotte Country Club, D. Clark, chn. building com., plans by Aymar Embury, 2nd, 150 East 61st St., New York, new club house. $150,000.

Okla., Oklahoma City—Oklahoma Club, Grand St., plans by Hawk & Parr, 1st Natl. Bank Bldg., 4 story, 100 x 140 ft., rein.-con., brick addition, Grand St. $250,000. Noted Feb. 27.

Pa., Johnstown—Masonic Temple Assn., R. J. Rose, pres., plans by J. C. Fulton & Sons, Uniontown, 3 story, basement, 100 x 120 ft., fireproof club. $300,000.

CONTRACTS AWARDED

Calif., Long Beach—W. H. Austin, archt., Pacific Southern Bldg., and Shilling & Shilling, archts., Long Beach, 3 story, basement, tower, rein.-con. club, Cedar Ave., to C. W. Pettifer Co., 733 West 14th St., for Elks Club, $315,500. Noted Sept. 11.

Calif., Los Angeles — Two Hundred and Thirty-Three Club, brick, concrete club, Yucca St., to DeCamp, Hudson, Seckles, Inc., 1277 West 24th St. $150,250.

N. J., West Caldwell — C. C. Wendehack, archt., 101 Park Ave., New York, general contract 2 story, basement, 115 x 220 ft., brick, steel, club house, swimming pool, to Mahoney-Troast Constr. Co., 657 Main Ave., Passaic, for Mountain Ridge Country Club, Prospect Ave., West Orange. Est. $200,000. Noted Aug. 21.

N. Y., Brooklyn—St. Peter Clavers Roman Catholic Church, 27 Claver Pl., 4 story, 100 x 112 ft. community center, to S. F. Musselwhite, 806 St. Johns Pl. Est. $450,000. Noted Sept. 11.

Tex., Dallas—Y. M. C. A., c/o W. A. Scott, secy., and E. T. Moore, chn. building com., general contract Central Y. M. C. A., 12 story, 122 x 133 ft., brick, concrete, steel, incl. 52 x 129 ft. gymnasium, to N. Wohlfeld, Dallas, $519,862; plumbing and heating, to Federal Plumbing & Heating Co., Dallas, $80,850; electrical work, to Electric Constr. Corp., $20,500. Grand total $621,212. Noted Aug. 28.

Ont., Peterboro — Y. M. C. A., 475 George St., general contract addition, to T. C. Ephgrove, 310 London St., plumbing, to P. L. Smith, Water St.; electrical work, to Miller-Powell Electric Co., 438 George St.; tile and terrazzo, to Connolly Marble, Mosaic & Tile Co., 235 College St., Toronto. Est. $150,000. Noted July 31.

HOSPITALS

PROPOSED WORK

Calif., Agnew—State of California, Pub. Wks. Bldg., Sacramento, plans by G. B. McDougall, Pub. Wks. Bldg., Sacramento, Farm Colony buildings, incl. 5 rein.-con. ward buildings, combined commissary, kitchen, power house, at state hospital. $252,000 available.

Calif., Santa Barbara—W. D. Sansum, c/o C. M. Winslow, archt., Architect Bldg., Los Angeles, 2 story, 50 x 150 ft., rein.-con. clinic. $150,000.

Conn., Willimantic—St. Joseph's Hospital, J. F. Carr, pres. trustees, Jackson Ave., brick, steel hospital unit, West Main St. and Mansfield Ave. $500,000. Architect not selected.

Me., Portland—Maine Eye & Ear Infirmary Corp., E. E. Holt, supt., hospital addition, Monroe Pl. $150,000 or more. Architect not selected.

Me., Togus — National Home for Disabled Volunteer Soldiers, R. I. Marston, Skowhegan, plans by Coombs & Harriman, 11 Lisbon St., Lewiston, 7 story, basement, 45 x 335 ft., brick, stone hospital, plain found. $750,000. Noted July 17.

Mass., Harwich — Central Cape Hospital Trust, C. T. Chase, pres., sketches by E. T. P. Graham, 171 Newbury St., Boston, 2 story, basement, brick, steel, hospital, nurses home, administration building, Main St. To exceed $150,000. Funds being raised. Noted Aug. 15.

Mass., Springfield—Springfield Hospital, 759 Chestnut St., rejected bids altering and constructing 7 story, basement, and 2 story, basement, brick, limestone hospital addition and service building, North Chestnut and Springfield Sts. $1,000,000. May revise plans and readvertise. Stevens & Lee, 45 Newbury St., Boston, archts. Noted Aug. 28.

N. Y., New York—Italian Benevolent Institute, 22 East 42nd St., 9 story nurses home, training school. $1,000,000. **Maturity in December.** DePace & Juster, 151 West 46th St., archts. Knopf & Storch, 17 West 44th St., structural engrs. D. Moray & Wallen, 101 Park Ave., mechanical engrs. Noted Apr. 24.

N. Y., Poughkeepsie—Vassar Hospital general contract nurses home, $400,00. **Maturity in spring.** McKim, Mead & White, 101 Park Ave., archts. C. F. Neergaard, 512 5th Ave., New York, consultant. Noted May 1.

N. Y., Yonkers—W. Katz, archt., 45 South Bway., bids early in October, clinic and health center, City Hall Park, for City. $300,000. Noted July 10.

BIDS ASKED

Ind., South Bend—Oct. 27, by F. P. Crowe, aud. St. Joseph Co., rein.-con., brick, hollow tile hospital, Niles Rd. $150,000. Austin & Shambleau, South Bend, archt.

Mass., Boston — Oct. 6, by New England Medical Center, J. A. Cousen, pres., Tufts College, and Andrews, Jones, Biscoe & Whittemore, archts., 50 Congress St., 5 story, basement, 50 x 150 ft., brick, steel nurses home, laboratory, plain found., Bennet St. corner Ash St. Est. exceeds $150,000. Noted Sept. 18.

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Hospitals (Continued)

Mass., Boston—Oct. 6, by Boston Floating Hospital, E. Dope, chn., 244 Washington St., 4 story, basement, brick, steel, plain found., Nassau St. $150,000 or more. Stevens & Lee, 45 Newbury St., archts. Noted Aug. 28.

N. J., Browns Mills—F. Grad, archt., 1023 Broad St., Newark, new bids about Oct. 15, general contract Deborah Sanitarium, 4 story, basement, brick, steel, plain found., for Deborah Jewish Relief Society, M. L. Unger, chn., 763 Broad St., Newark. $600,000. Noted Aug. 21.

N. Y., Hastings-on-Hudson — Jewish Mental Health Society bids about February, general contract hospital, $150,000, Gehron & Ross, 101 Park Ave., New York, archts. Noted Dec. 19, 1929.

N. Y., White Plains—St. Agnes Hospital, North St., bids about Nov. 1, general contract hospital, $900,000. F. J. Murphy, 280 West 240th St., New York, archts. Noted June 5.

CONTRACTS AWARDED

Massachusetts — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, 5 story, basement, brick, steel attendants home and assembly building, plain founds., at Metropolitan State Hospital, Trapelo Rd., Waltham, Belmont, and Lexington, to M. Spinelli & Sons, 333 Washington St., Boston, $198,900; heating and ventilating, to R. H. Baker Co., Inc., 238 Main St., Cambridge, $21,390; electrical work, to MacNeil Electric Co., 120 Jacques St., Somerville, $33,785. Grand total $264,075. Noted Sept. 18.

N. Y., New York—St. Vincent's Hospital, general contract (1st unit) hospital consisting outpatients building, clinic, to F. A. O'Hare Co., 270 Madison Ave. Noted Sept. 25.

Pa., Windber—Windber Hospital, W. S. Wheeler, in charge (1st unit), 2 story, 45 x 55 ft., brick, incl. dispensary, laboratory, clinic, offices, to Winber Constr. Co., Winber. Est. $300,000. Unit 2 a 50-bed addition will mature in spring.

CHURCHES

PROPOSED WORK

Mo., University City — Congregation Shaare Emeth, c/o 4915 West Pine Blvd., St. Louis, plans by A. Alschuler, 28 East Jackson Blvd., Chicago, Ill., rein.-con., brick, stone temple, 6900 Delmar Blvd. $400,000.

N. J., South River—Methodist Church sketches by A. Merchant, 1 Elm Row, New Brunswick, 1 and 2 story, tower, basement, brick, steel, Main and Gordon Sts. $150,000.

N. Y., Brooklyn — Union Temple, Eastern Parkway, bids late in spring, general contract temple, 17 Eastern Parkway. $1,000,000. Gehron & Ross, 101 Park Ave., New York, archts. Noted Feb. 27.

N. Y., Rome—Zion Episcopal Church, c/o H. Upjohn, archt., 70 East 45th St., New York, church. $150,000. **Maturity in spring.** Noted Feb. 6.

N. Y., Scarsdale—Baptist Community Church plans by H. B. Upjohn, Grand Central Terminal, New York, church. $250,000. G. E. Merrill, 23 East 26th St., New York, consult. archt. Noted Dec. 19.

O., Cleveland—Hungarian Reformed Church, J. Herczegh, pastor, 2854 East 79th St., plans by H. W. Maurer, 5716 Euclid Ave., 1 story, brick, steel, concrete, Buckeye Rd. and East Blvd. $200,000.

BIDS ASKED

Conn., Middletown—Oct. 10 (extended date), by Methodist Episcopal Church, J. Dodd, chn. building com., 1 story, basement, brick, stone, $200,000. Woodbury & Stuart, 581 Boylston St., Boston, Mass., archts. Noted Sept. 25.

Conn., New Haven—Oct. 9, by St. Thomas Episcopal Church, W. A. Beardsley, pastor, 2 story, basement, 110 x 220 ft., brick, stone church, parish house, rectory, Whitney Ave. $300,000. Allen & Collens, 75 Newbury St., Boston, Mass., archts. Noted June 26.

Ill., Oak Park — J. W. McCarthy & Co., archts., 139 North Clark St., bids about Oct. 3, brick, stone church, Austin Blvd., for Catholic Bishop of Chicago, 719 Cass St. $150,000. Noted Sept. 4.

Mont., Great Falls—Nov. 1, by First Presbyterian Church, brick, stone church, Central Ave. and 14th St. $150,000. McIver & Cohagen, Heddon Bldg., Billings, archts. Noted Feb. 26. Steam heating, etc.

N. J., Preakness—F. W. Wentworth, archt., 140 Market St., Paterson, bids about Oct. 15, general contract rebuilding church, for Preakness Reformed Church. $150,000. Noted Sept. 25.

CONTRACTS AWARDED

Mass., Arlington—St. James Parish, M. J. O'Connor, pastor, 1 story, basement, brick, stone, granite, plain found., to J. F. Griffin Co., 250 Stuart St., Boston. Est. $150,000-$160,000. Noted Sept. 11.

Mo., O'Fallon—St. Mary's Institute, Sisters of the Precious Blood, general contract 1 and 3 story, basement, 33 x 144 ft. and 57 x 158 ft., rein.-con., brick convent addition, to Hutter Constr. Co., Fond du Lac, Wis. Noted Aug. 28.

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N. J., Millburn—St. Rose of Lima Roman Catholic Church, L. I. Gardner, rector, 98 Arlington Ave., Hawthorne, general contract 2 story, basement, brick, steel, to Gilmore Bros., Inc., 679 Market St., Paterson. Est. $150,000. Noted Sept. 25.

SCHOOLS

PROPOSED WORK

Calif., Altadena—Pasadena City School Dist. plans by Marston & Maybury, 25 South Euclid Ave., Pasadena, 2 story, basement, brick school. $300,000.

Calif., Berkeley—Bd. Regents University of California plans by G. W. Kelham, 315 Montgomery St., San Francisco, Eshelman Memorial Building, (student publishing building) 2 story, rein.-con., on campus. $250,000.

Calif., San Francisco — City and San Francisco Co. plans by F. H. Meyer, 525 Market St., brick, steel high school annex, Scott and Geary Sts. $150,000.

Conn., Middletown—State, Lone Lane Farm, C. Penniman, supt., altering and constructing school, cottages, brick, steel, Lone Lane Farm. $300,000. Architect not selected.

Conn., Waterbury—City, M. J. Donovan, supt., plans by J. T. Smith, 42 Bank St., 2 story, brick, steel addition to Tinker School. $150,000.

Del., Newark—Delaware School Foundation, A. J. Taylor, vice pres., Du Pont Bldg., Wilmington, plans by Guilbert & Betelle, 20 Branford Pl., Newark, N. J., 2 story basement, brick, steel, rein.-con. addition, plain found. $150,000.

Ind., Delphi—Bd. Comrs. School Comrs. plans by O. P. Gordon, Greenfield, 2 story, basement, 115 x 175 ft., rein.-con., brick, stone school, incl. science, gymnasium, East Monroe St. $150,000.

Ind., Greenfield—Bd. School Comrs. plans by O. P. Gordon, Greenfield, 2 story, basement, 80 x 126 ft., brick, steel, stone, incl. 450 seating capacity gymnasium. $150,000.

Mass., Boston—City, Dpt. School Buildings, plans by H. R. Duffie, 364 Belgrade Ave., Roslindale and soon takes bids 3 story, brick, limestone Teachers College addition, plain found., Huntington Ave. near Longwood Ave. $250,000. Noted Dec. 5.

Mass., Lynn — City, Bd. Educ., brick, steel school. $300,000. Architect not selected.

Mass., Wakefield—Town, W. B. Atwell, supt. schools, sketches by J. W. Beal & Sons Co., 185 Devonshire St., Boston, Junior High School, 2 story, basement, brick, Main St. Est. exceeds $150,000. Noted Apr. 17.

Mich., Ishpeming—Bd. Educ. plans by Warren S. Holmes Co., Lansing, 3 story, basement, brick, steel, rein.-con. high school, plain found. $250,000.

N. J., Little Silver—Bd. Educ. sketches by E. A. Arend, Kinmouth Bldg., Asbury Park, 2 story, basement, brick, steel school, Markham Rd. $150,000.

N. J., North Plainfield — Bd. Educ., 125 Somerset St., plans by J. N. Pierson & Son, 198 Jefferson St., Perth Amboy, 2 story, basement, brick, steel. $150,000.

N. J., Piscataway town—Bd. Educ. Raritan Twp. plans by Jensen & Rasmussen, 218 Smith St., Perth Amboy, 2 story, basement, brick, steel addition to Oak Tree School. $150,000. Noted Aug. 7.

N. Y., Cold Spring—Bd. Educ., Dist. 13, bids about November, school. $250,000. Knappe & Morris, 171 Madison Ave., New York, archts. Noted Jan. 30.

N. J., Westfield — Bd. Educ., Clark St., sketches by Coffin & Coffin, 522 5th Ave., New York, 2 story, basement addition to McKinley School, Osborn Ave. $150,000. Noted July 3.

N. Y., Port Chester—Bd. Educ. bids late in November, general contract, high school, 1,000,000. Tooker & Marsh, 101 Park Ave., New York, archts. Noted June 19.

Pa., Phila. — St. Henry Roman Catholic Church, H. E. Koenes, pastor, 4404 North 6th St., plans by P. F. Getz, Victory Bldg., 3 story, basement school, 44 North 5th St. $300,000.

O., Cleveland—Bd. Educ., F. G. Hogen, dir., Standard Trust Bldg., plans by G. M. Hopkinson, Auditorium Garage Bldg., minor additions to Waverly, Landon, Woodland Hills, Denison, Kinsman and Union Schools, 2 stories each. $300,000.

R. I., Newport — City, H. W. Lull, supt. Schools, plans by D. Shapiro, Globe Bldg., Fall River, Mass., altering and constructing 2 story, basement, brick addition, Cranston St. $150,000. Noted July 10.

R. I., Providence—Brown University, Prospect St., C. A. Barbour, pres., plans by Howe & Church, 1014 Turks Head Bldg., brick, stone addition to Founce Hall. $150,000.

Ont., Markham—High School Bd. plans by Craig, Madill & Loudon, 96 Bloor St. W., Toronto, 2 or 3 story, basement, brick, stone high school, concrete found. $175,000.

Ont., Waterloo—Bd. Educ., J. C. Tweed, chm., receiving competitive sketches 2 story, basement, brick, concrete, stone, steel school. $165,000.

BIDS ASKED

La., New Orleans—Wogan & Bernard, archts., Baronne Bldg., taking bids 2 story, basement, 80 x 160 ft., brick, stucco, sheet metal, steel, iron school, incl. auditorium, wood pile found., Canal St., for Dominican Brothers, 4604 Canal St. $150,000.

Mass., Ayer—Oct. 8 (extended date), by Town, F. C. Johnson, supt. schools, 3 story, basement, 65 x 125 ft., and 43 x 60 ft., brick, steel high school, Main St. $160,000. R. H. Doane, 60 Batterymarch Pl., Boston, archts. Noted Sept. 25.

Mass., Holyoke—Oct. 6, by City, F. G. Burnham, mayor, City Hall, 2 story, basement, brick, stone, steel school, plain found., Maple St. $375,000. Allen & Collins, 75 Newbury St., Boston, archts. Noted Aug. 15.

Mass., Lowell—Our Lady of Lourdes Roman Catholic Church, J. A. Fortier, 725 Merrimack St., taking bids 2 story, basement, brick, stone parochial grade school, plain found., Smith Ave. $150,000. W. F. Fontaine, 285 Main St., Woonsocket, R. I., archt.

Mass., Newton—Boston College, J. M. Kilroy, 140 Commonwealth Ave., taking bids altering and constructing 1 story, basement, 90 x 105 ft. and 4 story, basement, 50 x 130 ft., brick, stone, granite additions to college, Commenwealth Ave. $150,000. Maginnis & Walsh, Statler Bldg., Boston, archts.

Mass., Yarmouth—Oct. 7, by Town, School Building Com., W. H. Martin, chn., c/o J. H. Ritchie & Associates, archts., 250 Stuart St., Boston, 2 story, basement, brick, stone grade and high school, plain found., South Yarmouth Sect. $200,000. Noted Sept. 11.

Mo., Tarkio—Oct. 3 (extended date), by Bd. Trustees Tarkio College, R. N. Montgomery, pres., 3 story, basement, 65 x 144 ft., brick, stone, rein.-con. administration building, and 57 x 75 ft. chapel. Felt, Dunham & Kriehn, 300 West 47th St., Kansas City, archts. Noted Sept. 18.

N. J., Englewood—L. C. Lucht, archt., 19 Knickerbocker Rd., taking bids 2 story, basement, 80 x 120 ft., brick, steel, East Palisade Ave., for Dwight School, Inc., 315 East Palisade Ave., $150,000.

N. J., Hillside (sta. Elizabeth) — Bd. Educ., H. W. Doremus, pres., Township Hall, bids about Nov. 15, 2 story, basement, brick, steel, rein.-con., plain found., Leslie St. and Winans Ave. $165,000. J. Wind, Jr., 1450 North Broad St., archt. Noted Oct. 2.

N. J., Hillside (sta. Elizabeth)—Bd. Educ., Township Hall, bids about Oct. 15, 2 story, basement, brick, steel, plain found., Conant and Winchester Aves. $175,000. J. Wind, Jr., 1450 North Broad St., Newark, archt.

N. J., Lakewood—Bd. Educ., Lakewood, bids about Nov. 1, 2 story, basement, brick, steel, rein.-con., plain found. $150,000. C. B. Cook, Asbury Park Trust Bldg., Asbury Park, archt. Noted July 31.

N. J., Linden—Bd. Educ., St. George Ave., bids about Nov. 15, 2 story, basement, brick, steel, rein.-con. addition to school 2, Wood Ave. $150,000. H. B. Brady, Inc., 333 North Broad St., Elizabeth, archt. Noted Aug. 14.

N. Y., Genesco—Oct. 14, by Commissioner Education, State Office Bldg., Albany, practice school at New York State Normal School.

N. Y., New Palz—Oct. 14, by Commisioner Dpt. Education, State Office Bldg., Albany, practice school, at New York State Normal School.

N. Y., New York—Oct. 7, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., Brooklyn, P. S. 72, Dewey Ave. from Edison to Logan Aves., for Bd. Educ., 500 Park Ave.

Pa., Clarks Summit—Oct. 13, by Joint School Dist. Clarks Summit and Clarks Green, G. R. Wood, secy., 418 Clark Ave., 2 story, basement, 134 x 208 ft. high school addition. A. J. Ward, County Bank Bldg., Scranton, archt.

Pa., Phila. — Oct. 7, by Bd. Educ., E. Merchant, secy., 19th and Ludlow Sts., 4 story, basement, 65 x 203 ft., rein.-con., brick, plain found., 12th St. $400,000. I. T. Catharine, 19th and Ludlow Sts., archt.

Pa., Pittsburgh—Bd. Educ., H. W. Cramblet, secy., Administration Bldg., taking bids electrical work Lincoln Elementary School, Lincoln St. and Frankstown Ave. Total cost $300,000. T. Pringle & O. J. Robling, 217 9th St., archts.

Pa., Washington—Oct. 7, by Bd. Educ., R. C. Buchanan, pres., general contract Junior and Senior High School, incl. 3 story, basement, 62 x 350 ft., brick main building, hollow tile found., 2 story, basement, 75 x 125 ft. rein.-con. shop building, 2 story, basement, 86 x 104 ft. auditorium, 2 story, basement, 76 x 165 ft, gymnasium and swimming pool, Jefferson and West Hallam Aves. $650,000. E. B. Lee, Chamber of Commerce Bldg., Pittsburgh, engr.

Ont., Toronto—Oct. 7, by W. W. Pearse, 155 College St., Earl Beatty School, 2 story, basement, concrete, stone, steel, brick, for Bd. Educ. $175,000. C. E. Dyson, archt.

CONTRACTS AWARDED

Calif., Los Angeles—City of Los Angeles School Dist., general contract Griffith Park Blvd. School, to H. Mayson, 229 Euclid Ave., Long Beach, $339,805; heating, ventilating and plumbing, to Cooney & Winterbottom, 2425 Hynter St., Los Angeles, 45,129. Noted June 5. Electrical work to American Electric Constr. Co., 757 East 9th St., $9,367.

Colo., Alamosa—Bd. Educ., School Dist. 2, A. O. Hiller, secy., general contract 2 story, 130 x 142 ft., brick, steel, concrete high school, to F. H. Cowell, Central Savings Bank Bldg., Denver, $139,792.

Conn., Hartford—Southwest School Dist., E. Dugan, chn. com., 2 story, basement, brick, steel addition, to Wise & Upson, 7 Forest St. Est. $150,000. Noted July 24.

Schools (Continued)

Conn., Middle Haddam—Town, Bd. Educ., 2 story, basement, brick, to T. Sellew, Cromwell. Est. $150,000. Noted Aug. 7.

Ill., Chicago—Bd. Educ., 188 West Randolph St., general contract Nicholas Senn High School Addition, to Lind Constr. Co., 6404 South State St., $314,650; fireproofing, to Illinois Fireproofing Co., 228 North La Salle St., $58,413; roofing, to Jacobson Roofing Co., 1518 North Western Ave., $10,118; sheet metal, to Lional Vallas, 2848 West Lake St., $26,608; miscellaneous steel and iron, to Reuter Bros., 5816 South Wood St., $19,266; structural steel, to Eggers-Schillo Co., 364 North Harding Ave., $85,145; steel erection, to A. Kerr, 5933 South Whipple Ave., $36,540; carpentry, to Coath & Goss, 549 West Randolph St., $132,725; steam heating, to W. V. Hoeir, 701 North Wells St., $175,740; heat regulation, to Johnson Serv. Co., 1355 West Washington St., $89,260; ventilation, to Rud Wiersig, Inc., 2311 North California Ave., $99,898; plumbing, to Chellberg Bros., 828 Grace St., $77,900; ash and coal conveyors, to Link Belt Co., 910 South Michigan Ave., $7,887; ash ejector, to Brady Conveyors Corp., 20 West Jackson Blvd., $1,737; plastering, to N. J. Parent Co., 5 South Wabash Ave., $54,640. Grand total $1,190,527. Noted July 31.

Ill., Chicago—Bd. Educ., 188 West Randolph St., general contract Gresham School Addition, to A. and E. Anderson Co., 228 North La Salle St., $51,230; fireproofing, to T. G. Nicholson Co., 53 West Jackson Blvd., $7,290; carpentry, to Michuda Bros. Constr. Co., Carmen and Christiana Aves., $15,900; plastering, to J. D. Corcoran, 189 West Madison St., $9,720; steam heating, to A. F. Walsh, 7445 Exchange Ave., $23,990; electrical work, to Southwest Electric Sales Co., 5049 South Ashland Ave., $16,485; plumbing, to J. J. Barrett Co., 549 West Randolph St., $3,766; roofing, to Chicago Roof Repairing Co., 2453 Irving Park Blvd., $995; sheet metal, to L. Vallas, 2848 West Lake St., $5,515; structural steel, to Wendnagel & Co., 600 West 22nd St., $7,300; steel erection, to A. Kerr, 5933 South Whipple Ave., $4,096; iron work, to Reuter Bros., 5816 South Wood St., $3,776; ventilating, to Acme Heat & Ventilating Co., 4228 Lowe Ave., $15,000; painting, to C. R. Jones, 4757 Kewanee Ave., $5,000; heat regulators, to National Regulator Co., 2301 North Knox Ave., $1,523. Grand total $171,586. Noted Aug. 14.

Ind., Lakeville—Bd. School Comrs. St. Joseph Co., general contract brick, steel grade and high school, to J. I. Barnes, Logansport. Est. $150,000. Noted Sept. 25.

Ia., Burlington—Bd. Educ., D. S. Cooper, secy., general contract Junior High School, 2 story, rein.-con., brick, stone, to Tapager Constr. Co., Albert Lee, Minn., $146,715.

Minn., Minneapolis—State Bd. Administration & Finance, Capitol, St. Paul, general contract 3 story, basement, brick, stone, rein.-con., State University, to Bracker Constr. Co., 752 Builders Exch., $211,991. Noted Aug. 28.

Neb., Sidney—Bd. Educ., N. W. Ladegard, secy., 2 and 3 story, 171 x 194 ft., brick, concrete high school, incl. auditorium, gymnasium, laboratories, to W. Knutzen, Kearney; heating, plumbing and ventilating, to E. L. Rodwell, 1810 St. Mary's St., Omaha; electrical wiring, to H. M. Brown, Sidney.

N. J., Long Branch—Bd. Educ., general contract altering and constructing 2 story, basement, brick, steel addition to Garfield School, Garfield Ave., to J. Sutherland, Inc., 222 Main St., Asbury Park; heating and ventilating, to W. F. Conklin, 310 Slocum Pl.; electrical work, to Edwards Electric Shop, 579 Bway. Est. $150,000. Noted Aug. 7.

N. Y., Lindenhurst—Bd. Educ., school, to Zerbe Constr. Co., 1136 Bway., New York. Est. $500,000. Noted Apr. 17.

N. Y., Mamaroneck—Bd. Educ., general contract Junior High School, to Acampora Bros., 14 Spencer Pl., Mamaroneck. Est. $150,000. Noted May 1.

N. Y., New Rochelle — Bd. Educ., 2 story school, to C. A. Williams, 100 East 42nd St., New York. Est. $550,000. Noted May 1.

N. Y., Tuxedo Park—Bd. Educ., general contract, G. F. Baker High and Grade School, 3 story, basement, brick, steel, to W. A. Berbusse, Jr., Inc., 35 Bush Ave., Port Chester; plumbing, to Ruehl & Hatfield, 384 South 10th St., Newark, N. J.; heating, to G. Stewart, 270 South 20th St., Newark, N. J.; electrical work, to A. Hasbrouck, Jr., 240 Main St., Hackensack, N. J. Est. $150,000. Noted Sept. 4.

O., Columbus—Bd. Trustees Ohio State University, C. L. Steeb, secy., Teachers Training School, 3 story, basement, 65 x 280 ft., brick, rein.-con., Indiana limestone, to D. W. McGrath & Sons, 255 East Broad St., $339,500; heating and plumbing, to Hoffman-Wolf Co., 669 North High St., $47,000. Noted Aug. 15.

O., Oberlin — Oberlin College, constructing theological quadrangle, swimming pool, dormitories, to Crowell & Little Constr. Co., Hanna Bldg., Cleveland. Est. exceeds $1,000,000.

Pa., Aliquippa—Bd. Educ., I. C. Wright, pres., 110 Major St., general contract Couper School, 3 story, basement, brick, steel to C. Andersoon Co., 5th and Insurance Sts., Beaver. $83,400.

Pa., Loretta—St. Francis College, W. Griffin, secy. Bd. Governors, 3 story, 46 x 98 ft., brick, stone, steel science building, to W. Diamond, 1060 McKinley St., Johnstown.

Tex., San Antonio — Bd. Educ., Lavaca and Water Sts., and Adams & Adams, archts., Real Estate Bldg., Senior High School, 2 story, Spanish Acres, to Walsh, Burney & Key, 928 North Flores St., $760,910; plumbing and heating, to Jud & Ormand, 703 North Flores St., $74,531; electrical work, to Crowther Electric Co., 2016 Bway., $33,790. Grand total $869,231. Noted Sept. 4.

Ont., Toronto—University of Toronto, Queens Park, general contract 4 story, basement, 80 x 100 ft., brick, stone, steel additions to mining building, concrete found., to George A. Fuller Co. of Canada Ltd., McLean Bldg. Est. $200,000.

THEATRES

PROPOSED WORK

Calif., Oakland—A. Kearne, et al., c/o G. A. Lansburgh, archts., 140 Montgomery St., theatre, 3,500 seating capacity, Bway., 20 and Franklin Sts.

Ill., Aurora—Publix-Balaban & Katz Corp., 175 North State St., Chicago, plans by Rapp & Rapp, 190 North State St., Chicago, rein.-con., brick, steel movie. $1,000,000.

Ill., Chicago—Publix-Balaban & Katz Corp., 175 North State St., plans by Rapp & Rapp, 190 North State St., rein.-con., brick, steel movie, 4,000 seating capacity, 63rd and Wallace Sts. $1,500,000. Noted July 3.

N. J., Newark—W. J. Eberson, archt., 370 Lexington Ave., New York, 1 story, basement, brick, steel, plain found., 878-80 Broad St., for Warner Bros. Pictures, Inc., 321 West 44th St., New York. $1,000,000. Project in abeyance. Noted July 31.

N. Y., New York—B. S. Moss Theatres, c/o Colony Theatre, Bway. and 55th St., theatre, 8th Ave. and 23rd St. **Maturity about Jan. 1.** $1,000,000. E. DeRosa, 15 West 44th St., archt. Noted Mar. 20.

N. Y., Niagara Falls—Cataract Theatre Corp., theatre. To exceed $150,000. Project in abeyance. V. A. Rigaumont, 1540 Bway., New York, archt. Noted Jan. 30.

N. Y., Plattsburg—Publix-Paramount Theatres, Paramount Bldg., New York, theatre. $150,000. **Maturity 1 nlate fall or winter.** Rapp & Rapp, Paramount Bldg., New York, archts. Noted May 15.

Pa., Coatesville—United Theatres, Inc., c/o L. Berman, Lewis Tower, Phila., plans by Hodgens & Hill, 130 South 15th St., Phila., 4 story, basement, 165 x 269 ft. theatre, store, apartment, 143-53 Main St.

CONTRACTS AWARDED

La., Lafayette—Southern Amusement Co., c/o Jefferson Theatre, Lafayette, and Lake Charles, 1 story, balcony, mezzanine, 60 x 140 ft., concrete, brick, steel, to C. H. King, Baton Rouge, $71,224. Noted Sept. 11.

Mass., Cambridge — O'Learys Inman Sq. Theatre, c/o J. Shapiro, 27 School St., Boston, rebuilding 1 story, basement, brick, steel, plain found., recently destroyed by fire, to Lincoln Constr. Co., Security Bldg., Lynn. Est. $150,000. Noted Sept. 25.

Pa., Reading—W. H. Lee, archt., 1505 Race St., Phila., 1 story, basement, 120 x 250 ft., rein.-con., brick, steel, incl. stores, plain found., to C. H. Schlegal, 528 Washington St., for Wilmer & Vincent, c/o A. Egan, 1451 Bway., New York. Est. $40,000. Noted Sept. 4.

BANKS

PROPOSED WORK

N. J., Montclair—Town Trust Co., 79 Walnut St., plans by Holmes & Von Schmid, 42 Church St., 1 story, basement, mezzanine bank, Grove St. $150,000. Noted Sept. 18.

N. J., Orange—Orange Savings Bank, 288 Main St., plans by Holmes & Winslow, 153 East 38th St., New York, 1 story, basement, brick, steel, $150,000.

N. Y., Syracuse—Onondaga County Savings Bank bids in November general contract altering bank. $500,000. Halsey, McCormack & Helmer, 286 5th Ave., New York, archts. Noted Sept. 11.

Pa., Phila.—Thalheimer & Weitz, archts., 10 South 18th St., soon lets contract 3 story, basement, 41 x 100 ft., rein.-con., brick, steel bank, office, plain found., Broad and Chew Sts., for North City Trust Co., Broad and Chew Sts., F. H. Schrenk, pres.

BIDS ASKED

N. J., Orange—Holmes & Winslow, archts., 153 East 38th St., New York, bids about Oct. 15, general contract 1 story, brick, steel, stone, for Orange Savings Bank, 288 Main St. $150,000. Noted Oct. 2.

N. J., South Orange — Myers & Shanley, archts., 24 Walnut St., Newark, new bids about Oct. 15, general contract altering and constructing 2 story, basement, brick, steel addition, for South Orange Trust Co., 53 South Orange Ave. $150,000. Noted Sept. 18.

CONTRACTS AWARDED

Ill., Chicago—Zimmerman, Saxe & Zimmerman, archts., 430 North Michigan Ave., masonry and carpentry contracts 2 story, brick, stone addition, to S. Nielsen Co., 3059 Augusta Ave., for Second Security Bank, 1951 Milwaukee Ave. Est. $150,000. Noted Sept. 4.

Mont., Helena—E. A. Tylor, dir. properties, First Natl. Bank Stock Corp., 602 Merchants Bank Bldg., St. Paul, Minn., 6 story, basement, rein.-con., brick, granite, stone bank, office, to Lovering-Longbottom Co., 605 Builders Exchange, St. Paul, Minn., for Owner, affiliated with 1st Bank Stock Corp. Est. $350,000. Noted Sept. 11.

N. Y., Bayshore—South Side Bank, Main St., 2 story bank and office, Main St., to J. H Earl & Son, 614 East 14th St., New York. Est. $150,000. Excavation in progress. Noted July 3.

OFFICES

PROPOSED WORK

Ind., Gary—Miller-Wohl Co., 455 7th Ave., New York, bids late in fall on general contract 5 story office, store, 652 Bway. $300,000. I. M. Cohen, 738 Bway., archt. Noted June 5.

Mass., New Bedford—New Bedford Times Pub. Co., Times Bldg., sketches by E. G. Bullard, Times Bldg., brick, steel office addition, Purchase and Middle Sts. $150,000.

Minn., Duluth—See "Factories and Mills."

N. J., East Orange—C. Mumma, 147 Halsted St., 2 story, basement, brick, steel, 100 x 100 ft. office, stores, Central Ave. and Amherst St. $150,000.

N. Y., New York—Corporation, c/o D. H. Knott, 222 West 23rd St., office, municipal building, Worth and Baxter Sts. $3,000,000. Project abandoned. Noted May 15.

N. Y., New York—Glenmont Realty Co., M. H. Harris, pres., 11 East 42nd St., plans by H. I. Feldman, 15 West 44th St., 2 story, 90 x 175 ft. office, stores, Tremont and Washington Aves. $150,000.

Utah, Salt Lake City—British-American Consolidated Properties Ltd., W. Henderson, dir., Republic Bldg., Seattle, Wsh., 22 story office. $1,500,000.

Wis., Milwaukee—Owner, c/o H. Caig Severance, archt., 36 West 44th St., New York, sketches 20 story, 100 x 150 ft. office, 9th and Wells St. **Maturity indefinite.**

BIDS ASKED

Calif., San Francisco — Oct. 9, by L. P. Hobart, archt., Crocker Bldg., 22 story, basement, rein.-con. addition, Bush St. near Sansome St., for Mills Estate, Mills Bldg. $2,000,000.

CONTRACTS AWARDED

Mich., Holland—Holland Furnace Co., 3 story, basement, 40 x 200 ft., brick, steel, concrete, incl. service department, plain found., to Frank Dyke & Co., Holland. Est. $250,000. Noted Sept. 11.

N. J., Clark—Clark Twp. Com., Fire Headquarters, sewers, to Araneo & White Constr., Inc., 1028 Augusta St., Elizabeth. $40,438. Noted Sept. 15 Daily.

N. J., Plainfield—F. A. Martin, general contract 2 story, basement, brick, steel, incl. stores, Park Ave., to A. Milne, 148 Park Ave. Est. $150,000.

N. D., Fargo—Black Co., M. Black, 114 Bway., concrete work for 8 story, basement, brick, steel, incl. store, 114 Bway., to T. F. Powers & Co., Fargo. Est. $350,000. Noted June 4.

STORES

PROPOSED WORK

Ind., Whiting—J. J. Kelly, c/o C. I. Botteron, archt., 612 119th St., 2 story, basement, 75 x 110 ft., brick, steel, store, recreation hall, 119th and Indianapolis Blvd. $150,000.

N. J., East Orange—Dablyn Realty Corp., H. Jaffe, 44 Court St., Brooklyn, N. Y., sketches by W. J. Fitzsimmons, 626 Central Ave., 2 story, basement, 100 x 175 ft., brick, steel stores, restaurant, bowling alley, 650 Central Ave. $150,000.

N. Y., Jamaica—P. Kramer, 8526 169th St., general contract store, loft, Hillside Ave. and 164th St. $150,000. **Maturity about February.** D. L. Levinson, 163-18 Jamaica Ave., archt. Noted Mar. 13.

O., Cleveland—Benjamin Rose Estate, P. A. Frye, bgr., Rose Bldg., plans by W. R. Powell, Rose Bldg., altering 4 store rooms into cafeteria, 2042 54th St. $350,000. Forum Cafeterias Co., Kansas City, Mo., lessee.

Ont., Toronto—Bd. Educ., 155 College St., plans by C. E. Dyson, 155 College St., 4 story, basement, concrete, brick, steel stores, garage, workshop building. $204,000.

BIDS ASKED

N. J., Elizabeth—A. J. Silberstein, archt., 868 Broad St., Newark, taking bids general contract 3 story, basement, brick, steel stores, apartment, Morris and Stiles Sts., for J. Cathcart, c/o architect. $150,000.

CONTRACTS AWARDED

Mass., Fall River—List Bros., 2nd St., 2 story, basement, brick, rein.-con., steel store, office, concrete found., 3rd and Pocasset Sts., to J. M. Darling, Jr. Co., South Main St. Est. $150,000.

Mass., Fall River—Mohecan Hotel, W. Durfee, 80 South Main St., 1 story, basement, brick, limestone, steel, granite store, concrete found., to J. M. Darling Jr. Co., South Main St. Est. exceeds $150,000. Part of theatre and store project, total est. $1,000,000. Noted Dec. 26, 1929, under "Residential."

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PUBLIC

PROPOSED WORK

Conn., Mystic — ADMINISTRATION — State, Mystic Oral School, brick, steel administration building. $200,000. Architect not selected.

N. J., Glen Ridge—MUNICIPAL—Bd. Boro Council, Boor Hall, bids about March, 2 story, basement, brick, steel, Ridgewood and Bloomfield Aves. $175,000. W. O. Bartlett, 24 Commerce St., Newark, archt. Noted Sept. 25.

N. J., Irvington (br. Newark) — POLICE HEADQUARTERS — Bd. Town Council, Township Hall, plans by G. F. Lederer, 2 Union Ave., 2 story, basement, brick, steel addition, Washington Ave. $150,000.

N. J., Paterson—OFFICE—Bd. City Comrs., City Hall, altering and constructing addition to old Y.M.C.A. building, for use as city office buildings.- 141 Ellison St. $150,000. Architect not selected.

N. Y., Attica—PRISON—Dpt. Correction, State Office Bldg., Albany, bids in November, administration, hospital, laundry and bath, state shop, shop, and textiles shop buildings, maintenance storehouse, ground lighting, plant telephone system and additional for prison wall, for Attica State Hospital. To exceed $1,000,000.

N. Y., Beacon—DORMITORY—Dpt. Correction, State Office Bldg., Albany, bids in November, female ward group, communicating corridor, new auditorium and chapel, Matteawan State Hospital. Noted Sept. 10.

N. Y., Great Meadows—ADMINISTRATION—Dpt. Correction, State Office Bldg., Albany, bids in October, administration building at Great Meadow Prison.

N. Y., Long Island City — BORO HALL and COURT HOUSE—G. U. Harvey, pres., Queens Boro, Queens Subway Bldg., bids in January, general contract boro hall and court house. $8,000,000. A. J. Thomas, 2 West 46th St., New York, archts. Noted May 1.

N. Y., New York—ARMORY—Armory Bd., City of New York, Municipal Bldg., bids in January, general contract addition, 5th Ave. and 142nd St. $1,000,000. Van Wart & Wein, 347 Madison Ave., archts. Noted June 19.

N. Y., Wellsville—LIBRARY—D. A. Howe Memorial Library, c/o E. L. Tilton, archt., 420 Lexington Ave., New York, bids about January, general contract library. Main St. $400,000. Financing campaign in progress. Noted Apr. 10.

N. Y., Yonkers—FIRE HOUSE and POLICE STATION—City of Yonkers, bids in fall, general contract 3 story, 84 x 88 ft., Central and Borcher Aves., $225,000. H. L. Quinch, 18 Getty Sq., archt. Noted Sept. 18.

Tex., Conroe—COURT HOUSE and JAIL—Montgomery Co., c/o A. W. Morris, plans by M. Deefee & E. White, 834 M. and M. Bldg., Houston, 3 story, basement, brick, stone, rein.-con. $200,000.

BIDS ASKED

Calif., Los Angeles—JAIL—Oct. 8, by Bd. P. Wks., City Hall, 5 story, basement, 45 x 200 ft. L shaped, rein.-con., Avenue 19. Noted Aug. 7.

Fla., Gainesville—INFIRMARY—Oct. 13, by State Bd. Control, P. K. Yonge, chn., Jacksonville, infirmary building at University of Florida. R. Weaver, archt. to Bd. Control, 204 Peabody Hall, Gainesville, archt.

N. J., Morristown — COURT HOUSE — Bd. Freeholders Morris Co., Court House, bids about Dec. 1, 4 story, basement, rein.-con., brick, steel addition, Court and Washington Sts. $250,000. Palmer & Plousky, 55 William St., New York, archts. Noted Mar. 27.

N. Y., Auburn—CELL BLOCK, etc.—Oct. 30, by Commisioner Dpt. Correction, State Office Bldg., Albany, North Cell Block, kitchen and bakery building, and mess hall, at Auburn State Prison. Noted Sept. 18.

Tex., Amarillo—COURT HOUSE—Oct. 28, by Potter Co., c/o S. B. Motlow, judge, and Townes, Lightfoot & Fink, archts., Johnson Bldg., general contract 8 story, basement, 84 x 140 ft., stone, steel court house. $420,000. Noted Sept. 18.

Tex., Liberty—COURT HOUSE—Oct. 30, by Liberty Co., c/o C. R. Wilson, judge, 3 story, brick, stone, steel, rein.-con. $250,000. C. G. Curtiss, 1628 Hawthorne St., Houston, archt. Noted May 8.

CONTRACTS AWARDED

Ind., Gary — COMMUNITY HOUSE — Union Espanol, general contract 2 story, basement, 65 x 100 ft., brick, steel, stucco, to Foster Lumber & Coal Co., Valparaiso. Est. $150,000. Noted Sept. 4.

Mass., Boston — LIBRARY — City, Library Dpt., superstructure 1 story, basement, brick, concrete branch library, plain found., to A. Piotti, 708 Dudley St., Dorchester, $85,069. Noted Sept. 4.

N. J., Trenton—LIBRARY and RECITATION—State Bd. Educ., State House Annex, general contract 2 story, basement, 105 x 150 ft. library and recitation building, to G. H. Evans, 1416 Vine St., Phila., Pa., $232,222; plumbing, to Burns, Lane & Richardson, 41 Adams St., Trenton, $10,227; heating, to D. McGrath Co., 185 Moore St., Hackensack, $24,390; electrical work, to J. T. Flanagan, Broad Street Bank Bldg., $14,600. Grand total $271,489. Noted Sept. 18.

O., Columbus — OFFICE — State Building Comn., C. D. Simral, secy., State House, general contract state office building, to Struck Constr. Co., Cincinnati, and 147 North Clay St., Louisville, Ky., $2,622,000 (Georgia marble) electrical work, to Paul L. Gilmore Co., 395 East Broad St., $179,000; heating, to P. H. Meyer, 635 South Preston St., Louisville, Ky., $99,250; ventilating, to R. P. Leiby, Columbus, $44,800; plumbing, to Eswein Heating & Plumbing Co., 546 West Broad St., $95,130. Grand total $3,039,880. Noted July 31.

Pa., Pottsville—COURT HOUSE—Bd. Comrs. Schuylkill Co., 3 story, basement, 84 x 106 ft., sandstone, steel, to Nelson Pedley Co., 1510 Chestnut St., Phila., $321,000; heating and plumbing, to Chambersburg Constr. Co., 139 North 2nd St., Chambersburg, $30,360. Electric wiring, to H. N. Crowder, 446 Union St., Allentown, $22,193. Grand total $373,553. Noted Aug. 28.

Que., Bordeau—JAIL—Dpt. P. Wks., constructing wing addition, to Atlas Constr. Co. Ltd., 37 Belmont St., Montreal, $238,770.

BUILDINGS—UNCLASSIFIED

PROPOSED WORK

Mass., Framingham — EXCHANGE — New England Telephone & Telegraph Co., 50 Oliver St., plans by R. C. Sturgis, 120 Boylston St., Boston, 3 story, basement, brick, stone, steel, concrete, concrete found., Lexington Ave. and Union St. $150,000.

Mo., St. Louis—CHAPEL and FUNERAL PARLOR—Ziegenheim Bros. Livery & Undertaking Co., 2623 Cherokee St. soon lets contract 2 story, basement, tower, 89 x 106 ft., brick, concrete, stone chapel and funeral parlor, Gravois St., Kinks Dr., North Lane and East Court. Taxis & Becker, 1201 Chemical Bldg., engrs. T. P. Barnett Co., 1569 Arcade Bldg., archt.

N. J., Newark—MARKET—Steuben Holding Corp., 60 Park Pl., sketches by F. H. Koenigsberger, 48 Walnut St., 2 story market, Linden and Washington Sts. $150,000.

N. Y., Jamestown—RAILROAD STATION—Erie R.R. Co., G. S. Fanning, ch. engr., 50 Church St., New York, bids in December or later, general contract passenger railroad station. $300,000. Noted Apr. 3.

N. Y., Maspeth—TERMINAL—H. C. Bohack Co., Flushing and Metropolitan Aves., Long Island City, terminal on Newtown Creek. $2,000,000. **Maturity in January.** Koch & Wagner, 32 Court St., Brooklyn, archts. Noted Aug. 7.

N. Y., New York—EXCHANGE—New York Telephone Co., 1775 Grand Concourse, bids about November general contract exchange. Trauman and Rowland Aves. $300,000. Voorhees, Gmelin & Walker, 101 Park Ave., archts.

O., Youngstown — NEWSPAPER PUBLISHING PLANT—J. W. Thomas, archt., 3868 Carnegie Ave., Cleveland, soon lets contract, 3 story, basement, brick, rein.-con. for Youngstown Telegram Co., c/o Scripps-Howard Co. $350,000. Noted Sept. 18.

Ore., Portland—TERMINAL and PASSENGER STATION—Multnomah Co. election $1,250,000, new terminal and passenger station, on Willamette River. G. W. Bush, Court House, co. engr.

Pa., Phila.—WORLD'S TRADE MART—Private Capitol sponsored by Philadelphia Business Progress Assn., Widener Bldg., plans by Ritter & Shay, Packard Bldg., 15 story, basement, 96 x 293 ft., rein.-con., brick, steel, plain found., Market St. between 22nd and 23rd Sts. $2,000,000.

BIDS ASKED

Mass., Taunton—COMFORT STATION—City, T. Scanlon, supt. Buildings, City Hall, taking bids 1 story, concrete, brick comfort station. $25,000. Noted May 29.

Mo., St. Louis—PUBLISHING—Midwest Industrial Development Co., c/o Illinois Terminal R.R., A. P. Titus, vice pres., 314 Shell Bldg., bids about Nov. 1, 5 story, basement, sub-basement, 120 x 168 ft., rein.-con., brick, stone, High, Morgan and 12th Sts. $1,500,000. F. D. Chase, Inc., 720 North Michigan Blvd., Chicago, Ill., archts. Star Chronicle Publishing Co., Elzey Roberts, publisher, St. Louis Star Bldg., 12th and Olive Sts., lessee.

N. J., South Orange—EXCHANGE—Voorhees, Gmelin & Walker, archts., 101 Park Ave., New York, taking bids general contract 3 story, basement, brick, steel, 169-77 South Orange Ave. for New Jersey Bell Telephone Co., 540 Broad St., Newark. Est. $150,000. Noted Aug. 28.

CONTRACTS AWARDED

Ill., Chicago—STATION—Chicago & Northwestern R.R. Co., 400 West Madison St., W. J. Towne, ch. engr., masonry contract 2 story, 235 x 680 ft., 260,000 sq.ft. oor space, 90,000 sq.ft. loading platform area, to Anderson & Co., 37 West Van Buren St. Est. $1,400,000. Noted May 1.

Mass., North Reading—EMPLOYEES—Commonwealth of Massachusetts, Dpt. P. Health, 3 story, basement, brick, stone male employees building at State Sanatorium, to Suffolk Constr. Co., 70 Norwell St., Dorchester; nurses home addition, to Klayman Constr. Co., 92 Hazelton St., Mattapan. Est. $150,000. Noted Sept. 4.

Buildings

FACTORIES AND MILLS

PROPOSED WORK

Calif., Wilmington—FACTORY—Pacific Fiber & Cordage Co., 2740 Pacific St., San Pedro, sketches 1 story, 60 x 150 ft., steel, corrugated iron. $100,000. Private plans.

Colo., Pubelo — FACTORY — International Rubber Co., c/o R. C. Sudbury, Denver, factory.

Colo., Pueblo — OIL REFINERY — Rocky Mountain Refinery, Inc., c/o C. B. Stone, c/o Pueblo Chamber of Commerce. (1st unit) 1,000 bbl. daily capacity oil refinery, Portland Ave. and Missouri Pacific R.R. $100,000.

Conn., New Britain—PLANT—Southern New England Ice Co., R. G. Hadley, pres., Corbin Pl., ice manufacturing plant, brick, steel, concrete, Corbin Pl. $100,000. Private plans.

Ind., Anderson—CANNING PLANT—Stokely Bros. & Co., Louisville, Ky., enlarging plant, installing new machinery, 22nd and Henry Sts. $40,000.

Mich., Detroit — MILL — Great Lakes Steel Corp., Union Trust Bldg., subsidiary National Steel Corp., 1319-23 Kingsbury St., Chicago, Ill., 10 in. merchant mill.

Mo., St. Louis—MANUFACTURING PLANT—St. Louis Screw & Bolt Co., E. J. Miller, pres., 6900 North Bway., soon takes bids 1 story, 180 x 240 ft., brick, steel addition. $250,000.

N. J., Perth Amboy—DAIRY PLANT—Ballinger Co., archts., 100 East 42nd St., New York, soon lets general contract 1 and 2 story, brick, steel, for Puritan Dairy Products Co., 683 New Brunswick Ave. Est. $40,000.

N. Y., Napanoch—INDUSTRIAL—Dpt. Correction, Albany, bids in October, industrial shop and storehouse, State Institution for Defective Delinquents. Noted Mar. 13.

N. Y., Ossining—LAUNDRY—Dpt. Correction, State Office Bldg., Albany, bids in November, laundry and bath building at Sing Sing Prison. To exceed $40,000.

O., Cleveland — FACTORY, etc. — Cleveland Wire Wks., (Incandescent Lamp Dept. of General Electric Co., E. G. Edward, mgr. plant extensions, Nela Park) 1 story, 320 x 370 ft., brick, steel, concrete main factory, power plant, boiler house, Chardon Rd. $750,000. Private plans.

R. I., Saylesville—PLANT—Sayles Finishing Plants, Inc., c/o Lockwood Greene Engineers, Inc., engrs., 24 Federal St., Boston, Mass., textile printing plant bleachery. $40,000 or more.

Tex., San Antonio — CERAMIC PLANT — Southwest Ceramic Products Co., Independence, Mo., ceramic products plant. $250,000.

BIDS ASKED

Conn., New Britain—FACTORY—Oct. 3, by Eastern Malleable Iron Co., 62 John St., 2 story, brick addition. $40,000. M. Unkiebach, 52 Main St., archt.

Conn., New Haven—PASTEURIZING PLANT—L. J. A. Julianelle, archt., Metropolitan Bldg., taking bids 1 story, brick, terra cotta, incl. equipment, for Shepard Dairy, Whalley Ave.

Ind., Ft. Wayne—FACTORY—Fries Tool & Machine Co., 1918 East Wayne St., bids about Nov. 1, brick, steel addition. $40,000. G. Mahurin, 425 Standard Bldg., archt.

Ind., Terre Haute—PLANT—Vigo-American Clay Co. taking bids brick, steel kilns. $40,000. Private plans.

Ind., Washington—PLANT—Coca Cola Co. bids about Oct. 6, 2 story, 50 x 100 ft., rein.-con., brick, steel plant. $40,000. B. Clawson, Washington, archt.

Mass., Everett—PLANT—Merrimac Chemical Co., Chemical Lane, taking bids 1 story, brick, concrete, steel, chemical building addition, concrete found., Chemical Lane. $50,000. Private plans.

Mass., Natick—ICE PLANT—J. A. Hill, 90 Pond St., taking bids 1 story, brick, steel, artificial ice plant, West Central St. $75,000. C. Coneby Eng. & Constr. Co., 1580 Ansol Rd., Cleveland, O., engrs. Noted Sept. 4.

Mass., Salem—LAUNDRY—Oct. 3, by Salem Laundry Co., 51 Lafayette St., and Densmore, Le Clear & Robbins, archts., Park Sq. Bldg., Boston, 4 story, basement, brick addition, Derby St. $40,000. Noted Sept. 25

N. J., Jersey City—ICE PLANT—Mongiello Bros., 625 Communipaw Ave., bids about Oct. 15 on revised plans 1 story, basement, 100 x 100 ft., brick, steel. $50,000. C. H. Ziegler, 26 Journal Sq., archt. Noted Sept. 8.

N. J., Newark — FACTORY — M. A. Wolf, archt., 845 Broad St., bids about Oct. 15, general contract 1 story, basement, brick, steel addition, 170 Delancy St., for P. A. Singer & Bros., 113 New Jersey R.R. Ave. $40,000. Noted Sept. 25.

N. J., Union City — DAIRY PLANT — G. Willaredt, archt., 411 23rd St., West New York, bids about Nov. 1, general contract altering and constructing 2 story, basement, 28 x 155 ft. brick, steel addition, 45th St. and New York Ave., for Consumers Dairy Co., 400 45th St. $45,000. Noted Sept. 4.

O., Negley—FACTORY—J. E. White Co., East Palestine, bids about Nov. 16, continuous kiln plant. $50,000. P. J. Cronol, East Palestine supervises construction.

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Factories and Mills (Continued)

Tex., Houston—REFINERY, etc.—See "Contracts Awarded."

Ont., Toronto—WINERY—Kaplan & Sprachman, archts., 305 Dundas St. W., taking bids 1 story, basement, 100 x 100 ft., concrete, brick addition, Danforth Ave., for Danforth Wine Co., 355 Danforth Ave. $50,000.

CONTRACTS AWARDED

Ala., Anniston — FACTORY, etc. — Alabama Coca Cola Bottling Co., 2 story, basement, 71 x 130 ft., brick, rein.-con. factory, garage, to Duke, Stickney & Duke, Anniston, $75,000. Noted Aug. 28.

Calif., Corona—PACKING PLANT—Orange Heights Fruit Assn., 1 story, basement, concrete, steel, to Hamm, Grant & Bruner, 607 Ferguson Bldg., Los Angeles, $45,250.

Ill., Bellwood—PLANT—Koro Corp., 3021 West Madison St., 1 story, 75 x 200 ft., to Holton, Seelye & Co., 140 South Dearborn St., Chicago. Est. $50,000.

Ind., Elwood—FACTORY—G. I. Sellers & Son, brick, steel addition, $40,000. Owner builds. Private plans.

Mass., Fitchburg — MANUFACTURING — Simonds Saw & Steel Co., G. K. Simonds, genl. mgr., 55 North St., 360 x 550 ft., brick, concrete, steel factory, to Austin Co., 120 Bway., New York, and Newark, N. J. Est. $1,500,000. Noted Sept. 11.

Mass., Haverhill—MILL—M. Stevens & Son Co., Winter St., altering and constructing 1 story, brick addition, plain found., to C. M. Kelley, 24 Pleasant St. Est. $40,000.

Minn., Duluth — GAS PLANT — Minnesota Power & Light Co., 30 West Superior St., (1st unit) 8 story, rein.-con., brick building in connection with gas distribution plant, containing office quarters, to Zenith Dredge Co., 13th Ave. W. Est. $2,000,000.

Miss., Corinth—FACTORY—Corinth Hosiery Mills, 2 story, 100 x 300 ft., concrete, steel, brick, to H. A. McGuire & Co., Dermon Bldg., Memphis, Tenn., $100,000.

Mo., St. Louis—LAUNDRY—Sunshine Family Wash Co., 2323 Rutger St., 1 story, basement, 50 x 100 ft., rein.-con., brick addition, concrete found., 2348 Rutgers St., to W. C. Harting Constr. Co., 722 Chestnut St.

Ore., Klamath Falls—BAKERY—C. Landes, 2 story, basement, 42 x 100 ft., brick, rein.-con., 7th and Main Sts., to J. Quinn Constr. Co., Klamath Falls, $40,000.

Tex., Houston—REFINERY, etc.—Sinclair Refining Co., 45 Nassau St., New York, refinery and transport facilities, Houston Ship Channel, day labor and separate contracts, $2,000,000. Private plans.

Ont., Hamilton — CASTING PLANT and PATTERSON SHOP—Canada Iron Foundries Ltd., Stuart St., general contract 1 story, 90 x 140 ft., steel, brick, concrete found., to W. H. Cooper, Lister Bldg.; structural steel, to Hamilton Bridge Co. Ltd., Bay St. N. Est. $50,000.

Ont., Kitchener—PACKING PLANT—J. M. Schneider & Sons, Courtland St. E., 50 x 120 ft. lard refining plant. Owner builds. Interested in prices everything.

Ont., St. Catherines—FACTORY—Grouts Ltd. Silk Mills, Welland Ave., 50 x 200 ft., brick, steel addition, to Wilde & Brydon, 1006 Canadian Pacific R.R. Bldg., Toronto.

Ont., Toronto—PRINTING PLANT—Stainton & Evis, 232 Bay St., general contract 6 story, basement, steel, concrete printing plant, office, to Christman-Burke Ltd., Canada Permanent Bldg. Est $175,000. Noted Aug. 7.

GARAGES

PROPOSED WORK

N. J., Perth Amboy—Pub. Serv. Co. Ordinated Transport Co., Terminal Bldg., Newark, brick, steel bus terminal. $150,000. Private plans.

N. J., Union City — F. Romano, 352 New York Ave., sketches by J. D. Helmers, 145 Summit Ave., 2 story, basement, brick, steel, plain found., 14th St. $155,000.

N. Y., Brooklyn—J. S. Kennedy, archt., 157 Remsen St., bids late in November, general contract service garage, Pacific St. and Boerum Pl., for Court Square Sales & Renting Corp., J. Weinstein, pres., 26 Court St. $375,000. Noted May 1.

N. Y., Brooklyn—J. A. Flanagan, 672 72nd St., 2 story, 100 x 100 ft. service garage, $75,000. **Maturity about Jan. 1.** F. H. Klie, 250 Park Ave., New York, archt. Noted July 25.

N. Y., Brooklyn—J. Kostman bids in December, general and separate contracts altering, fireproofing and constructing 2 story service garage addition, Flatbush and Nostrand Aves. $40,000. F. H. Klie, 250 Park Ave., New York, archt. Noted Sept. 11.

N. Y., Brooklyn—R. Sanders, 494 14th St., soon takes bids on separate contracts 2 story, 50 x 163 ft. service garage, Prospect and 5th Aves. $75,000. F. H. Klie, 250 Park Ave., New York, archt. Noted Sept. 11.

BIDS ASKED

Mass., Greenfield—See "Contracts Awarded."

N. Y., Brooklyn — C. Strang, 356 Coney Island Ave., taking bids general and separate contracts service garage, Coney Island Ave. and Caton Pl. $50,000. E. M. Adelsohn, 26 Court St., archt. Noted July 10.

N. Y., New York — Helklar Realty Corp., L. N. Heller, pres., 1891 Washington Ave., taking bids on separate contracts 2 story, 100 x 109 ft. service garage, Webster Ave. and 204th St. $75,000. H. I. Feldman, 15 West 44th St., archt. Noted Sept. 18.

Wash., Seattle—Oct. 10, by J. C. Stanley, archt., Republic Bldg., 2 story, basement, 120 x 360 ft., brick, steel, rein.-con. garage, 9th Ave. and John St., for Commercial Tire Co. $500,000.

CONTRACTS AWARDED

Conn., Danbury—Danbury & Bethel Gas & Electric Co., 238 Main St., brick, steel garage, warehouse, service building, to L. F. Sweeney, 15 Bates Pl. Est. $60,000. Noted Sept. 11.

Ill., Blue Island — E. E. and E. C. Roberts, archts., 88 West Washington St., Chicago, general contract garage, stable, 120th St. and Vincennes Ave., to G. Thompson & Son, 30 North La Salle St., Chicago, for Bordens Dairy Farm Products of Illinois. Est. $100,000.

Ill., Chicago—Goy-George Motor Co., Ford Agency, 4301 West North Ave., general contract 2 story, concrete, brick, stone sales and service building, on 100 x 190 ft. site, 4141-45 West Grand Ave., to Patterson & Hartrich, 140 South Dearborn St. Est. $100,000.

Ind., Indianapolis—Pure Oil Co., 1951 Madison Ave., general contract brick, steel superior service station, shop, 619 East Washington St., to Moss Constr. Co., 1218 Olive St., St. Louis, Mo. Est. $40,000.

Mass., Everett — Merrimac Chemical Co., Chemical Lane, 1 story, rein.-con., steel garage, concrete found., to Aberthaw Co., 80 Federal St., Boston. Est. $40,000 or more. Noted Sept. 25.

Mass., Greenfield—Greenfield Buick Co., J. S. Faulkner, 1 story, rein.-con., steel service garage, plain found., Miles St., separate contracts, $50,000. F. A. McSheffrey, 857 Commonwealth Ave., Boston, archts.

R. I., Lincoln—Dpt. State Police, Providence, 1 and 2 story, brick, concrete service building and police barracks, to A. F. Smiley Constr. Co., 202 Oak Hall Bldg., Pawtucket. Est. $75,000. Noted July 24.

SHOPS AND FOUNDRIES

PROPOSED WORK

Calif., Los Angeles—PIPE SHOP—Crane Co., Dunsmuir St., plans by Morgan, Walls & Clements, Van Nuys Bldg., 80 x 150 ft. addition, steel, corrugated iron covering, incl. traveling crane.

Mass., Boston—WORK SHOP—Boston Terminal Co., South Station, 2 story, 100 x 600 ft. postal work shop, rear of South Station. To exceed $40,000. Private plans.

N. J., Maplewood—SHOP and GARAGES—LeRoy Schenck, 513 Valey St., rejected bids 2 story, basement, brick, steel, 531 Valey St. $40,000. R. B. Platt, 600 Bloomfield Ave., Bloomfield, archt. Noted Aug. 7.

N. Y., Attica—SHOPS—See "Public."

N. Y., Auburn—FOUNDRY—Dpt. Correction, State Office Bldg., Albany, bids in October, foundry shop building, shop building and storehouse for Industries, at Auburn State Prison.

N. Y., New York — REPAIR SHOP — Consolidated Gas Co. of New York, 4 Irving Pl., soon takes bids general contract 3 story, 99 x 100 ft., 71st and Exterior Sts. $350,000. Private plans. Noted July 3.

N. Y., New York—REPAIR SHOP—F. Levy, 60 Wadsworth Ave., auto repair shop, 651 West 176th St. $40,000. B. R. Swartburg, 2 West 46th St., archt. **Maturity in spring.** Noted Sept. 18.

Ont., Brockville—ELECTRICAL SHOP, etc.—J. M. Miller, archt., 648 Dorchester St., Montreal, Que., soon lets contract, 1 story, steel, concrete, brick electrical shop, machine shop, boiler house, rubber room, braiding room, finishing shop, for E. F. Phillips Electrical Co. Ltd. st. $500,000.

BIDS ASKED

N. Y., Long Island City — CAR REPAIR SHOP—See "Contracts Awarded."

CONTRACTS AWARDED

Conn., Bridgeport—SHOP, etc.—T. J. Pardy Constr. Co., 1481 Seaview Ave., 1 story, 20 x 30 ft., 2 story, 60 x 65 ft., 1 story, 25 x 36 ft., brick, concrete woodworking mill addition, storage, blacksmith shop, incl. 700 ft. dock development with storage facilities, Seaview Ave. $40,000. Owner builds. Private plans.

Ind., Elkhart—FOUNDRY—H. E. La Bour Fdry. Co., steel, hollow tile, brick, 1537 Sterling Ave. $41,000. Owner builds. Private plans.

Mo., St. Louis—SHOP, etc.—Bd. Educ., 911 Locust St., general contract 4 story, basement, 101 x 150 ft. rein.-con., brick, stone shops, building to W. MacDonald Constr. Co., 3400 Thomas St. $136,913, plumbing, to E. J. Fischer, 4134 Westminster St. $8,574, automatic sprinkler system, to T. J. Sheehan Co., 2223 Olive St. $9,597, heating, to Modern Heating Co., 3935 Olive St. $11,900, electrical wiring, to P. Wendt Elecrtic Co., 4141 West Florissant Ave. $21,400: 1 story, 92 x 99 ft. palm house, to Lord & Burnham, 6100 Prescott Ave. $11,745, stacks, to Wiederholdt Constr. Co., Bank of Commerce Bldg., $8,230, boiler and stoker, to Laclede Stoker Co., 4438 Hunt St. $6,330, combustion control, to Hagan Corp., 6635 Delmar Blvd., $1,785, uniflow engine, to Nordberg Mfg. Co., Fullerton Bldg., $20,500. Grand total $236,974. Rejected bids Sept. 3, for elevator for shop building and boiler and smokestack for power house. Noted Aug. 28.

N. Y., Long Island City — CAR REPAIR SHOP — Brooklyn & Queens Transit Co., 385 Flatbush Ave., Brooklyn, car repair shop, DeKalb Ave., day labor. $75,000. Noted June 19.

N. Y., Ossining — SHOE SHOP — Commissioner Correction, State Office Bldg., Albany, general shoe shop, Sing Sing Prison, to Miller & Gaynor Co., Overlook Rd., Poughkeepsie, $132,558; heating and sanitary work, to J. Winkel Co., Inc., 66 Larchmont Ave., Larchmont, $7,775 and $12,100 respectively; electrical work; to J. S. Quinby's Sons, Chappaqua, $5,800. Grand total $158,233. Noted Aug. 26.

POWER PLANTS

PROPOSED WORK

Calif., Agnew—See "Hospitals."

Ind., Greenwood—Gulf Pipe Line Co., Frick Bldg., Pittsburgh, Pa., brick, steel power plant, pumping station. $250,000. Private plans.

La., Morgan City — City cancelled, until further notice, bids that were to have been opened Sept. 16, two 400 kw. oil engine generating units complete with accessories, two 350 g.p.m. domestic service motor driven pumps, 5,700 ft. 10 in. and 1,500 ft. 6 in. Class B c.i. pipe, one each 1,000 and 3,000 g.p.m. low head motor driven pumps, hydrants, valves, boxes, pipe switchboard, two 1,000 g.p.m. Underwriter motor driven pumps, 12,000 gal. oil storage tank, electrical transmission system. Swanson & McGraw, Balter Bldg., New Orleans, engrs. Noted Sept. 11.

Texas — Central Power & Light Co., Frost Bldg., San Antonio, made application to Federal Power Comn., to construct 3,000 hp. hydroelectric plant on Guadalupe River between Victoria and Cuero. $2,000,000. Private plans.

BIDS ASKED

Mo., Sikeston—City, P. H. Stevenson, clk., bids about Oct. 15, general contract 40 x 80 ft., concrete, brick, power plant, 25 ft. high, incl. 2 diesel engines, complete distribution system, $150,000. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, engrs. Noted Apr. 17.

CONTRACTS AWARDED

Conn., New Haven — St. Raphael Hospital, 1442 Chapel St., 1 story, 68 x 80 ft., brick, steel, concrete boiler house, laundry, to E. McKeown, 937 Dixwell Ave. Est. $40,000.

Mass., Everett—Boston Consolidated Gas Co., 250 Stuart St., Boston, 1 story, concrete switch house, Dexter St., to Long Constr. Co., 185 Devonshire St., Boston.

Mass., South Weymouth—Weymouth Light & Power Co., 1371 Commercial St., Weymouth, 1 story, brick, steel sub-station, concrete found., to Clark & Smith, 13 Temple St., Quincy. Est. $40,000. Noted Sept. 25.

Mich., Detroit — J. S. Foley, secy., Public Lighting Comn., installing metal clad switching equipment, for Woodward Terminal Substation, to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., $63,250. Noted Aug. 14.

WAREHOUSES

PROPOSED WORK

Calif., Los Angeles—Robinson Fireproof Building Co., c/o W. Richards, Architects Bldg., 67 x 93 x 230 ft., rein.-con., steel warehouse, 8th Pl. $100,000 or more.

N. J., Passaic—J. Finkelstein, 165 Lafayette Ave., rejected bids 1 story, basement, brick, steel, rein.-con. warehouse, Exchange Pl. $150,000. H. Gerritsen, 118 Passaic Ave., Garfield, archt. Noted Aug. 28.

N. Y., Yonkers — McCann Storage Warehouse Co., 1 Mill St., will award general contract Nov. 1, 7 story, rein.-con., School St. $225,000. All bids in. Lewis & Leonard, 51 East 42nd St., New York, archts. Noted Jan. 2.

O., Sebring—Sebring Pottery Co., 1 story, brick, steel, concrete warehouse addition. $40,000.

BIDS ASKED

Mass., Wayland—Wayland Motors Co., State Rd., taking bids 1 story, 50 x 100 ft., concrete storage building, concrete found., State Rd. To exceed $40,000. Rosenblatt Bros., 120 Concord St., Framingham, archts. Noted Aug. 7.

CONTRACTS AWARDED

Ind., Evansville—Mead Johnson Terminal Corp., St. Joseph Ave. two 1 story warehouse buildings, one 121 x 174 ft., other 151 x 412 ft., for river and rail terminal, on Ohio River, to M. J. Hoffman Constr. Co., Central Union Bank Bldg. Est. $125,000.

Mass., Quincy—A. F. Peterson & Sons, 69 Hancock St., Atlantic, 1 story, irregular sized, concrete storage and work room, 11 Newbury St., to W. A. Kline Co., 156 Summer St., Chelsea.

N. Y., Harrison—J. E. Nitchie, archt., World Bldg., New York, general contract 2 story, basement, 110 x 200 ft., brick, steel, concrete warehouse, showroom, to I. Hopper & Son, 6 East 45th St., New York, for Beherer Co., c/o architect. Contractor taking bids on separate contracts. Noted Sept. 4.

Tenn., Memphis—Patterson Transfer Co., 24 North 2nd St., R. E. Galloway, pres., 2 story, rein.-con. 100,000 sq.ft. floor space to Consolidated Constr. Co., Memphis, $140,000. Noted Aug. 7.

See proposal advertising on page 146

Constr. News page 145

Looking South on Fifth Avenue, New York, from 25th Street

The Cleveland Trinidad Paving Co.
Cleveland, O.

Branch FLUSHING, N.Y.

SEPT. 22nd *1930*

Lone Star Cement Company New York Inc.,
342 Madison Avenue,
New York City.

Gentlemen:

In reply to your inquiry as to the use of your "Incor" high-early-strength Portland cement, in the re-paving of Fifth Avenue, from 14th Street to 42nd Street, in New York City.

Fifth Avenue, as you know, is one of the busiest streets in the world and speed in re-paving was of great importance. Our contract with the City of New York specified quick hardening cement in the reconstruction of the concrete base.

A considerable quantity of "Incor" was used in repairing the old concrete base on that portion of the contract between 14th and 23rd Streets. Concrete placed in the afternoon, was in every instance ready for the asphalt surfacing the following morning, enabling us to open the avenue with a minimum of delay to traffic.

Without a material like "Incor" Cement, having high early strength, it would have taken weeks longer to complete a job of this nature where speed is of paramount importance.

Yours very truly

THE CLEVELAND TRINIDAD PAVING CO.

H. C. Lang,
Vice President

HCL-C

WHERE TIME-SAVING COUNTS

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"Lone Star" and "Incor" Cements
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LONE STAR CEMENT CO. INDIANA, Inc.
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LONE STAR CEMENT CO. PENNSYLVANIA
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LONE STAR CEMENT CO. VIRGINIA, Inc.
LONE STAR CEMENT CO. NEW YORK, Inc.
LONE STAR CEMENT CO. LOUISIANA
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342 MADISON AVENUE, NEW YORK, N. Y.

TIME-SAVING was of vital importance when Fifth Avenue was repaved recently by the Cleveland Trinidad Paving Company. Between 14th Street and 23rd Street, "INCOR" Cement was used in repairing the concrete base. Traffic delays were reduced to a minimum.

Concrete made with "INCOR" attains service strength 24 hours after placing. It is a Perfected High-Early-Strength Portland Cement . . . contains no admixtures . . . requires no special methods of handling . . . and amply fulfills the requirements of the tentative specifications for high-early-strength Portland Cement of the American Society for Testing Materials.

Let us explain the advantages of "INCOR" as applied to your own problems. Engineers of the "INCOR"* Division will gladly co-operate with you.

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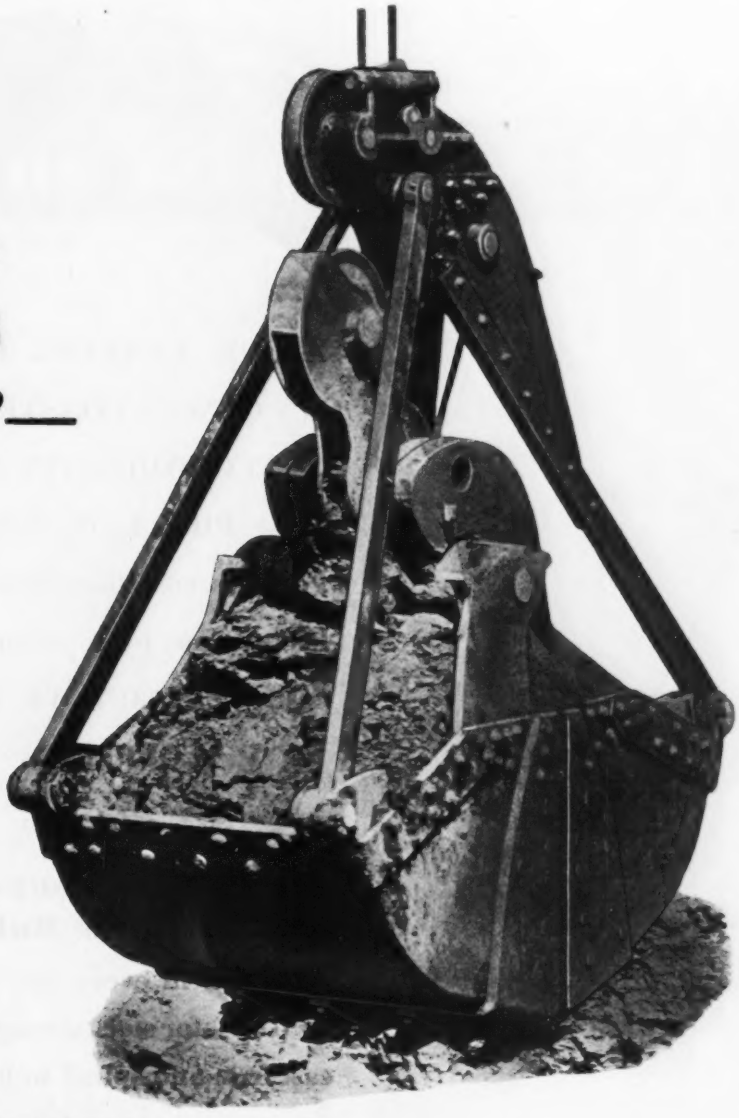

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CHECK over the new "Champion," and you'll see many improvements that put this super-bucket in a class by itself for digging power and speed—

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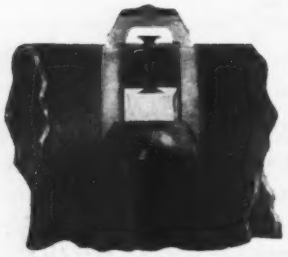

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